Journal of the Royal Society of Arts

NO. 5017 DECEMBER 1957 VOL. CVI

TWO HUNDRED AND FOURTH SESSION 1957–58

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A list of Standing Committees for 1957–58 is published on pages 63–67 of this issue.

VISIT OF H.R.H. THE PRESIDENT

His Royal Highness The Duke of Edinburgh, attended by Mr. James Orr, visited the Society's House on 7th November, when he took luncheon with the Chairman and Members of the Council, and in the afternoon presided at a Special Meeting of the Society.

At an informal ceremony soon after his arrival, His Royal Highness presented the Benjamin Franklin Medal which was awarded to Professor F. C. Williams, of Manchester University, for his contributions to electrical engineering. His Royal Highness said that it gave him particular pleasure to make this, the first, presentation of the medal, which was instituted in 1956 to commemorate Benjamin Franklin's election to membership of the Society 200 years ago, and is to be awarded annually 'to individuals who have attained early distinction, with promise of future achievement, in the promotion of arts, manufactures and commerce'. Professor Williams, in a brief reply, said that he was honoured, both to be the first recipient of the medal, and to receive it from His Royal Highness personally.

Members of Council present at the luncheon which followed included: Sir Alfred Bossom (Chairman); Mrs. Mary Adams; Dr. W. Greenhouse Allt; The Hon. G. C. H. Chubb; Mr. Robin Darwin; Sir Ernest Goodale; Sir William Halcrow; The Earl of Halsbury; Mr. A. C. Hartley; Dr. R. W. Holland; Mr. William Johnstone; Lord Latham; Mr. Edgar Lawley; Sir Herman Lebus; Mr. F. A. Mercer; Mr. Oswald P. Milne; Sir William Ogg; The Earl of Radnor; Mr. E. Munro Runtz; Professor R. D. Russell; Sir Harold Saunders; Dr. Dudley Stamp; Sir Stephen Tallents; Mr. G. E. Tonge; Mr. Hugh A. Warren, and Miss Anna Zinkeisen. Professor and Mrs. S. C. Williams were also present, with Dr. K. W. Luckhurst (Secretary) and Mr. G. E. Mercer (Deputy Secretary).

A large number of Fellows attended the Special Meeting, when His Royal Highness formally presented his gift of a new lecture bench to the Society. He then presented an R.D.I. Diploma to Mr. Misha Black, and the Bicentenary Medal to Sir Ernest Goodale. Finally, Professor R. D. Russell, Master of the Faculty of Royal Designers for Industry, delivered an Oration on '*Quality*'. A full account of the Proceedings begins on page 18 of this issue, and a description of the Lecture Bench is given on page 6.

FORTHCOMING MEETINGS

MONDAY, 2ND DECEMBER, at 6 p.m. The first of three CANTOR LECTURES on '*Some Practical Aspects of Book Production*', entitled '*The Publisher's Approach and Responsibilities*', by Philip Unwin, of George Allen & Unwin, Ltd.

WEDNESDAY, 4TH DECEMBER, at 2.30 p.m. '*Some Nutritional Aspects of Vitamin B_{12}*', by Frank Wokes, B.Sc., Ph.D., F.R.I.C., Director of Research, Ovaltine Research Laboratories. Sir Allen Daley, M.D., F.R.C.P., Chairman, United Kingdom Committee for the World Health Organization, in the Chair. (The paper will be illustrated with lantern slides.)

THURSDAY, 5TH DECEMBER, at 5.15 p.m. COMMONWEALTH SECTION. '*The Conquest of Malaria*', by Professor George Macdonald, C.M.G., M.D., F.R.C.P., Director of the Ross Institute of Tropical Hygiene. Sir S. Rickard Christophers, C.I.E., O.B.E., F.R.S., M.B., I.M.S.(retd.), in the Chair. (Tea will be served in the Library from 4.30 p.m.)

FRIDAY, 6TH DECEMBER, at 7.30 p.m. FILM EVENING. '*Foothold on Antarctica*', '*The Enquiring Mind*', '*African Heritage*'. Light refreshments will be served in the Library afterwards. (Details of the films to be shown were given on page 949 of the last issue of the *Journal*.)

MONDAY, 9TH DECEMBER, at 6 p.m. The second of three CANTOR LECTURES on '*Some Practical Aspects of Book Production*', entitled '*The Role of the Printer*', by John Lewis, F.S.I.A., Tutor in Typography, Royal College of Art, and Art Director, W. S. Cowell, Ltd.

WEDNESDAY, 11TH DECEMBER, at 2.30 p.m. '*The Design of Shops To-day*', by Ellis E. Somake, F.R.I.B.A., M.S.I.A. S. H. Leake, O.B.E., Chairman, Selfridges, Ltd., in the Chair.

MONDAY, 16TH DECEMBER, at 6 p.m. The last of three CANTOR LECTURES on '*Some Practical Aspects of Book Production*', entitled '*The Bookbinder and the Finished Product*', by Lewis Kitcat, of G. & J. Kitcat, Ltd.

WEDNESDAY, 18TH DECEMBER, at 2.30 p.m. '*Sir George Cayley (1773–1857): A Pioneer of Science and Engineering*', by Captain J. Laurence Pritchard, C.B.E., Hon.F.R.Ae.S., formerly Secretary of the Royal Aeronautical Society. C. H. Gibbs-Smith, M.A., Keeper of Extension Services, Victoria and Albert Museum, in the Chair. (The paper will be illustrated with lantern slides.)

WEDNESDAY, 1ST JANUARY, at 2.30 p.m. DR. MANN JUVENILE LECTURE. '*Into Space*', by Patrick Moore, F.R.A.S. (The lecture will be illustrated with lantern slides, and tea will be served in the Library afterwards. See Special Notice, concerning admission, overleaf.)

WEDNESDAY, 1ST JANUARY, at 6.30 p.m. FILM EVENING. (*Programme will be announced in the next issue of the Journal. As is the custom with the January Film Evening, the films will be chosen with a view to the possibility that some Fellows may care to bring their older children on this occasion.*)

MONDAY, 6TH JANUARY, at 2.30 p.m. JUVENILE LECTURE. '*Cloth from the Chemist*', by J. R. Whinfield, C.B.E., M.A., F.R.I.C., of Imperial Chemical Industries, Ltd. (The lecture will be illustrated with demonstrations and lantern slides, and tea will be served in the Library afterwards. See Special Notice, concerning admission, below.)

THURSDAY, 9TH JANUARY, at 5.15 p.m. COMMONWEALTH SECTION. '*New Zealand Seen by a Political Scientist*', by Professor K. J. Scott, M.A., LL.B., D.P.A., Associate Professor of Political Science, Victoria University College, Wellington, New Zealand. His Excellency the Honble. Sir Clifton Webb, K.C.M.G., Q.C., High Commissioner for New Zealand, in the Chair. (Tea will be served in the Library from 4.30 p.m.)

Fellows are entitled to attend any of the Society's meetings without tickets (except where otherwise stated), and may also bring two guests. When they cannot accompany their guests, Fellows may give them special passes, books of which can be obtained on application to the Secretary.

JUVENILE LECTURES

Special tickets for the Juvenile Lectures announced above will shortly be available, and will, when ready, be sent to Fellows on request as far as the accommodation of the Lecture Hall permits.

Fellows are entitled to apply for tickets admitting one adult and two children to each lecture, and should state their exact requirements within these limits when making application.

CHEQUES ACT 1957

In accordance with the provisions of the Cheques Act 1957, no formal receipts for subscriptions paid by cheque will be issued in future, except to Fellows who specifically request them.

It is proposed, however, to send Fellows a confirmation of the renewal of their membership and, in view of this, it is hoped that they will accept their paid endorsed cheques, when returned by their banks, in lieu of the formal receipts.

JOURNAL INDEX AND BINDING CASES

The index and title-page for Volume 105 of the *Journal* are in preparation and will shortly be available, free of charge, to Fellows who ask for them. Orders for binding cases (with which copies of the index and title-page are automatically supplied), price 7*s.* each, post free, should be sent to Messrs. P. G. Chapman & Co., Ltd., Kent House Lane, Beckenham, Kent, who will also undertake binding at an additional cost.

MEETING OF COUNCIL

A meeting of Council was held on Monday, 11th November, 1957. Present: Sir Alfred Bossom (in the Chair); Mrs. Mary Adams; The Honble. G. C. H. Chubb; Sir Edward Crowe; Mr. Robin Darwin; Sir Ernest Goodale; Sir William Halcrow; The Earl of Halsbury; Mr. A. C. Hartley; Dr. R. W. Holland; Mr. William Johnstone; Mr. Edgar Lawley; Mr. F. A. Mercer; Mr. O. P. Milne; Sir William Ogg; The Earl of Radnor; Sir Harold Saunders; Sir Selwyn Selwyn-Clarke; Dr. Dudley Stamp; Sir Stephen Tallents; Professor S. Tolansky; Mr. G. E. Tonge and Sir Griffith Williams; with Dr. K. W. Luckhurst (Secretary); Mr. G. E. Mercer (Deputy Secretary) and Mr. J. S. Skidmore (Assistant Secretary).

ELECTIONS

The following candidates were duly elected Fellows of the Society:

Bettison, Roger, A.T.D., West Hartlepool, Co. Durham.
Campbell, James Gordon, New York, U.S.A.
Cleveland-Stevens, Robert Victor Carnegie, M.A., London.
Conklin, John P., Jr., Brooklyn, U.S.A.
Forbes, Professor William Fredrick, B.Sc., Ph.D., D.I.C., Newfoundland, Canada.
George, Miss Mary, M.B.E., London.
Halcrow, Leonard John Digby, M.A., Godalming, Surrey.
Halliwell, Alexander Ewart, Hampton Wick, Middx.
Hasson, Dudley, Folkestone, Kent.
Johns, Frederick John Alfred Ambrose, Eccles, Lancs.
Kendall, Edward John Harry, A.R.I.C.S., Bristol, Glos.
Kerr, Henry, Johannesburg, South Africa.
Lane, Fred, Stockport, Cheshire.
Lawson, Mrs. Gillian Eveline Mary, Petts Wood, Kent.
McDavid, Sir Edwin Frank, C.M.G., C.B.E., British Guiana, West Indies.
McDonald, John Duncan, M.A., M.Sc., Westport, New Zealand.
McKie, Professor Douglas, D.Sc., Ph.D., London.
Paul, Herbert Kenneth, Ph.D., London.
Sadler, George Thomas, F.C.P., Petts Wood, Kent.
Servolini, Professor Luigi, D.Lit., D.F.A., Milan, Italy.
Trewin, Thomas Eustace, Kidderminster, Worcs.
Very, Gordon Henry, Sheerness, Kent.
Waith, James Arnold, Smethwick, Staffs.
Wood, Basil John, B.A., Epsom, Surrey.

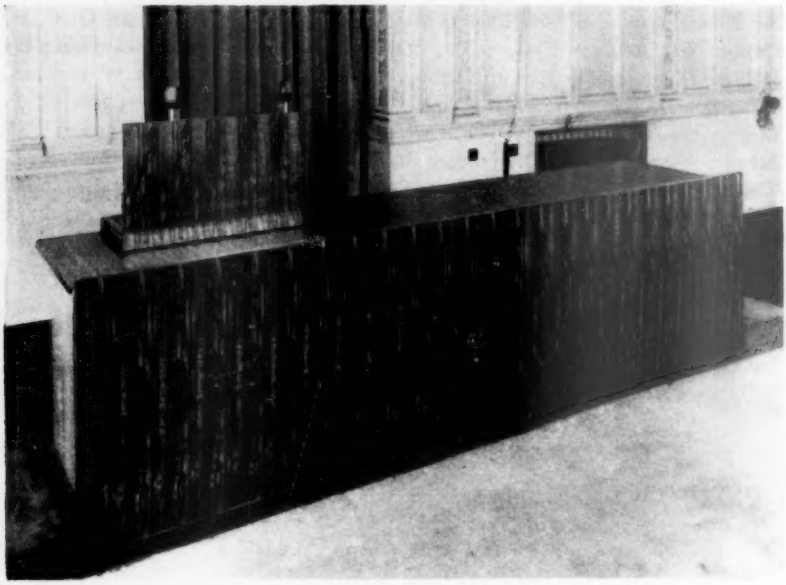
EXAMINATIONS

It was reported that 21,101 entries had been received for the Autumn series of Examinations as against 18,182 in 1956.

OTHER BUSINESS

A quantity of financial and other business was transacted.

THE SOCIETY'S NEW LECTURE BENCH

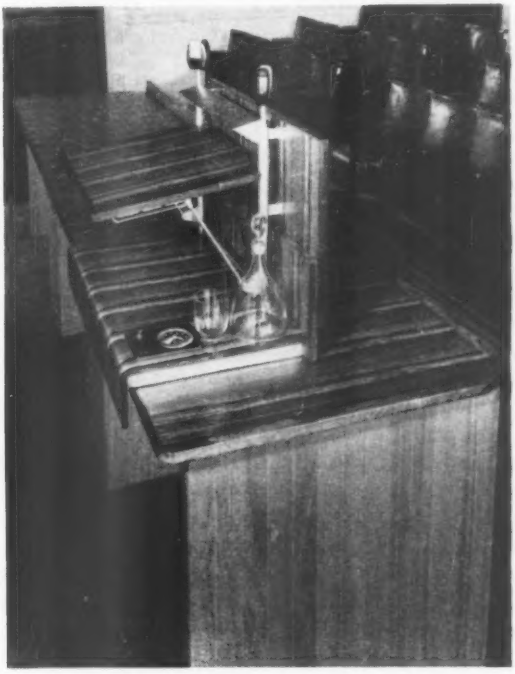


His Royal Highness The President's gift comprises a platform table and lectern. The table has been made with a front panel and top of beautifully figured Brazilian rosewood, and inset ends of mahogany boarding. The movable lectern is also in Brazilian rosewood, with a chassis of matt-finished chromium-plated steel.

The table was designed to meet His Royal Highness's wish that its face to the Chairman should be no less presentable and considered than its face to the audience, and the large number of electrical and other services on the Chairman's side have therefore as far as possible been enclosed, but in such a way as to be conveniently at hand when wanted. The electrical services in frequent use are housed in mahogany pedestals on either side of the Chairman's central position, whilst the equipment occasionally used is enclosed by sliding doors at the back of the kneeholes. At the express desire of His Royal Highness the lectern has been fitted with a number of aids to efficiency and comfort, including built-in microphones, a mechanism for the easy adjustment of the note rest, shaded strip lighting, an electric clock, and a 'next-slide' signal button.

The table and lectern were designed by Professor R. D. Russell, Master of the Faculty of Royal Designers for Industry and Professor of Furniture Design at the Royal College of Art, and made by Gordon Russell Ltd. The craftsman

chiefly responsible for the work was Mr. Hubert Allaway, who had the honour of being presented to The Duke of Edinburgh when His Royal Highness made a private inspection of the lecture bench during his visit to the Society's House on 7th November.



A side view of the table and lectern, showing, on the latter, the electric clock, the microphones, and the water carafe and glass, which stand in specially made recesses. On the left of the picture, beneath the table, can be seen the pedestals which contain the electrical services most often required

THE NEXT HUNDRED YEARS

The Inaugural Address of the 204th Session by

SIR ALFRED BOSSOM, BT., LL.D., F.R.I.B.A., J.P., M.P.,

Chairman of Council of the Society, delivered to the Society on Wednesday, 6th November, 1957

In 1857 His Royal Highness Albert, Prince Consort, was President of the Royal Society of Arts, the continent of Europe was recovering from the effects of the Crimean War, and England from the shock of the Indian Mutiny. Only a few years later, in 1861, began the devastating American Civil War.

For the first time, England was considering studiously prepared reports on sanitary science in war and peace produced by Florence Nightingale.

The hundred years since that time have been crowded with inventions and stimulated by research, both steadily accelerating and far beyond the achievements in any previous similar period.

Under such circumstances, it is unlikely that the years ahead will witness any lessening of the rate and range of changes; in fact, there seems every likelihood there will be still more rapid alterations as the years fly past. It seems as though the full rapacity of progress has yet to be experienced, and few would doubt that a world undreamed of, with a fundamentally changed outlook, will evolve in the days to come. The future is nebulous and fabulous, but obviously this forecast is made on the assumption that the great nations do not commit collective suicide by indulging in an atomic world war.

With crippling taxes being extracted from most of the world's leading peoples, it would be rash to hope that some minor atomic conflict will not be instigated by a major power through one of its satellites, if only to test the devastating qualities of the weapons so many are frantically stockpiling. But is it not equally reasonable to hope that, having witnessed the appalling consequences of even a limited conflict, the whole world will recoil against the inescapable results of a vaster calamity and recognize that any enlargement of a nuclear combat would mean the total destruction of civilization? And that all nations will in consequence agree to abandon entirely such a frightful self-inflicted sacrifice, and determine that hereafter international differences *must* be settled round the conference table and not by world-wide *hara-kiri*?

Equally, most thinking people will assume that Nature will produce a continuous galaxy of intellectual giants in the coming years as it has in the past, and that they in turn will cause even more drastic evolutions in the ways of life, production and outlook than did their predecessors.

To foretell the future is impossible. Even to speculate on possibilities as they will affect the average man demands a thorough scanning of the alterations that have so dramatically transformed human existence during the last hundred years. To-day, standards of living have reached the highest level ever known.

The plague of unemployment has relatively ended in many lands; education, of its kind, has become almost universal in first-class countries; medical and surgical science has simply leaped ahead, with astonishing results; transportation has passed from the horse-and-buggy and steam train era to that of the sound-barrier-breaking jet plane, and several nations are almost within reach of inter-planetary transport. Long distance telegraph, telephone and radar communication have for some time been commonplace, and travel by water has grown beyond all relationship to the wooden-walled paddle boat. Mechanical duplication of the written word, coupled with photography and cable and wireless, make the dispersal of news almost instantaneous as well as world-encircling, and increasingly ingenious digital computers progressively curtail millions of hours of what formerly was boring labour. Creation of energy is no longer confined to power generated by wood, coal, oil or water; nuclear reactors are multiplying and power can already be conveyed any distance by means of either cables or wires.

Such are the advances in the sciences of manufacture and commerce that they have entirely obscured social conditions that prevailed in the recent days of our parents. Forms of government in many countries have made a complete revolution and we might, with justice, define the present as 'the interregnum of rapid transference from the age-old normal, rocketing into the unanticipated infinite'.

What incredible developments may we encounter in the years that lie immediately ahead?

Neither you, ladies and gentlemen, nor I, may be here in 2057 unless—and it is by no means impossible—some medical genius discovers how to reinvigorate our tired vital organs and muscles, and so unpredictably prolong the years of desirable life. The world's population is now roughly estimated as being in the neighbourhood of 2,500 million, with a steadily increasing majority of non-white folk. Even with to-day's life-sustaining capabilities, a progressive increase of one per cent a year in the population is practically certain; thus the year 2057 may well find the earth populated by anything from 6 to 8,000 millions of more or less civilized souls. Will man working upon Nature be able to produce the food needed to provide a comfortable and suitable diet for all of them? He will: by using all available cultivable and pastoral land and also applying every intensive mechanized aid. These means, augmented by the daily forced encouragement of scientifically stimulating fertilizers in the suitable soils or other media, and also by the generation of any needful heat, whether solar or man-created, will undoubtedly cause the crops of vegetable foods to increase immeasurably. To these efforts will indubitably be added the grafting of food growths upon other, and to-day's non-food-producing, types of vegetation. These should make the vegetable food-stuff yield literally limitless, and if, in addition, man causes specially arranged and created disturbances in the upper atmosphere, it will be possible to adjust to desirable conditions the climate of any large section of the earth.

As to meats, artificial insemination intelligently and humanely applied is

capable of enlarging the world's protein supply immensely; added to this, by the crossing and inter-breeding with animals not to-day normally used for food, many entirely new breeds of edible animals will become available.

Equally too, the man-encouraged propagation of all the approved fishes will further produce vast additions to the menu and fill another gap in the world's dietary. By such methods, and others, all the required sustenance will be forthcoming.

No doubt the science of refrigeration, chilling, canning, drying, compressing and storage, coupled with the enlargement of means of distribution, will make certain that the tremendously increased favourite dietetic needs will be met, no matter where such needs may develop. Huge manufacturing centres capable of completely preparing every kind of food, fully cooked or suitably treated for indefinite future consumption, will be constructed so that meals for either individual families or huge national multitudes will be obtainable, and will only require to be placed in time- and temperature-controlled mechanical heaters or freezers to be made almost perfect for immediate use.

Should any of the world's existing heat-producing mediums come to be in short supply, there is little doubt there will be a genius who will, after tapping all the present known processes, devise means of harnessing any required heat from the inner depths of the earth, from sea water or from the sun's rays, and of carrying this vital necessity to the place requiring it, and in the form desired.

Looking ahead, the revolution most startling to the average person may well be that in social relationships; for with the stupendous increase of the world's population and the progressive increase of non-whites over the whites, and influenced by the unlimited ability to travel temporarily or for permanent migrations, intermarriage between people of different racial stocks will become increasingly usual. Consequently, these mixed social traditions in families will most likely be accompanied by a deterioration in standards of behaviour and morals, and a lessening of the appreciation of the finer graces of life.

With this lowering of the standards and codes of behaviour, there may well arise among deep thinkers a mighty endeavour to correct this trend by most actively encouraging a survival of appreciation of the arts as a counter to the crudenesses which always seem to develop among the masses of peoples when those of different antecedents intermarry. Therefore it is likely that there may steadily grow again a world-wide appreciation of music, painting, sculpture, literature, architecture, during the hundred years ahead of us. From time to time freak styles and fashions of extreme irregularity may well gain passing popularity, but man, being what he is, a balanced creature, will probably react as in the past, and a sense of symmetry will revive, both towards the arts and in behaviour.

Perhaps the most appalling waste to-day, in respect both of time and effort, arises from the settling of individuals in uncongenial occupations. Every member of the human race has some natural bent or tendency, hence educationalists may well insist that all institutions of learning shall include on their staffs several highly trained technical and scientific psychologists, whose task it will be

to find the natural inclinations of each child, and ensure that these proclivities are encouraged until the growing boys and girls are enabled to take up and be efficient in some appropriate and gainful occupation. Events already indicate that, in the future, all those mentally and physically capable will have to work; not perhaps for so long each day, but each will have to fulfil some definite task.

As a matter of fact, a policy of detailed psychological character research is already overdue in ordinary educational establishments. By its introduction and intensive application great strides will be made in developing and educating technicians capable of pursuing lives of valuable production and scientific research for the benefit of the whole of mankind.

Television and radio will be called upon increasingly to play their parts in the fields of education. Equally, instruction in personal hygiene and the preservation of health will be an important part of all curricula.

It follows that concurrently with this preparation of the population for an intelligent, happy and healthy life, each Government will maintain most detailed and accurate records of its labour needs in each type of activity, which records will be regularly distributed to all educational establishments. Consequently, after the essential rudiments of knowledge, and the advantages of the preservation of health, have been inculcated into and are thoroughly understood by the pupils, each one will be intelligently guided to study subjects that will make for eligibility and efficiency in a future career.

Nation-wide individual medical check-ups will be compulsory for every person, irrespective of age, at regular intervals, and any physical defects revealed will at once be cared for. These check-ups will be more frequent as age increases, to ensure that life can be enjoyed without avoidable pain or discomfort.

The benefit of suitable occupational education and health training is so self-evident that it is surprising that it has not already been insisted upon, and there seems no doubt that it will be in due course.

It is of interest to note that the majority of university-educated women are more fertile than their less informed sisters, because the former usually know how to care for their health and are trained for their activity. Thus there will undoubtedly be greater insistence on appropriate education for all. To get the maximum advantage of such treatment, all expectant mothers will be required to follow a thorough course of preparation in every pre-natal matter, in order to ensure that all children shall come into the world with the best natural equipment that completely thorough preparation can provide, and at the same time to leave the mother strong, fit and free from the troubles and complaints that now occasionally form the aftermath of childbirth.

Hospitals will no longer be constructed within cities or in densely built-up areas; all will be in open country, and only emergency stations will be permitted within cities or towns. The pestilential diseases, cancer, the rheumatic group, the common cold, and the infectious and contagious complaints will, in the years before us, be more readily curable than they are to-day, due to the health training from the earliest years of youth and the new drugs which no doubt will be created, and the new curative procedures developed. Recognition of the

immense importance of the most thorough research in every field of human activity or interest will progressively increase, and man will know how to protect himself against agonies now considered incurable—not only with new drugs and procedures, but also by actual new elements which most certainly will be discovered and put to the service of mankind.

Races differ, but in some, about one in ten persons (in others, it is nearer to one in five) of the population is born with the mental capacity and disposition to undertake the responsibility of leadership essential in 'captains of industry', members of the learned professions, trade union leaders, schoolmasters or factory foremen. This natural human progression no doubt will continue.

As the next hundred years roll by, domestic helpers as an industrial group will dwindle and finally disappear. Homes for the majority of people will consist of individually run establishments or flats, constructed with skeleton panel construction using the minimum of steel and the minimum of other materials and labour, having frequently such media as stressed concrete frames and tile walling. Such houses and flats will generally have one quite large room with an alcove for the mechanical preparation of food. This will largely be pre-prepared, requiring only to be placed in an apparatus which, by setting a few dials and knobs, will automatically get the food ready at the desired time and in the right condition, whether hot or cold, with the appropriate sauces or additions supplied from the central providing store.

Connected with the larger room in each dwelling will be a number of smaller ones for sleeping or for study in privacy, each with its complement of pure running water, regulatable heat and air-conditioner gadget, and each fitted from its inception with all the labour-saving devices needed, which will progressively be invented as the years pass.

Almost every house will have a small car and a small vertically-rising aeroplane, which will fly in specially radar-defined paths in the sky, with warning radar invisible screens which, to prevent accidents, will give oral warnings if the plane gets out of bounds.

Air in the cities and towns will soon be thoroughly clean, free from smog, dust, carbon monoxide from cars, malignant gases or industrial fumes, and the risks to-day attendant upon leakages from the nuclear reactors. The labour, often more or less drudgery, to-day inseparable from the running of a home, will be reduced, everything possible being done by ultra labour-saving or mechanical devices, so permitting the maximum of freedom for the housewife and the family as a whole. Power, energy for lighting, heating, cooking and air-conditioning, will be picked up by an aerial from some central generating station, as television is to-day.

Caravans, self-propelled, larger than is usual to-day and not infrequently double-decked will, by older people, be often used as permanent living accommodation, moving north in summer and south in winter irrespective of national boundaries. For within a reasonable time frontiers will not be a hindrance, and these caravans will be the home for holidays. Local authorities will designate

areas equipped with fresh water and sanitary amenities, as well as a general supply store to provide for those using caravans as permanent homes.

Of course all houses will have telephones which will be able to talk to moving cars up to great distances, as well as giving present-day service and recording messages that may be telephoned in the absence of the occupant.

The ultimate size of large cities will be definitely limited, and the number of inhabitants rigidly circumscribed within the defined green belts. Large buildings, generally offices, flats and factories, will be legally permitted to be built to a far greater height—double or treble the present limit; also, a specific number of structures will be allowed to be much taller, but these skyscrapers will be permitted only on specially defined sites, all pre-planned by the regulating planning authorities. More and more open spaces will be insisted upon within city limits. All cuttings, sidings and railway marshalling-yards will be covered over, and thus their upper surfaces will provide free and open spaces. No agricultural land will be seized except for growing food.

Slums will disappear and not be permitted to develop again. If the incoming tenants are not competent to treat a decent habitation appropriately, they will be required to spend some time learning how to do so. New internal thoroughfares will be constructed, wider than is usual to-day and capable of accommodating the increased traffic; and no doubt automatic mechanical parking will be compulsory. These mechanical parking structures will be located at regular intervals to avoid congestion with the incoming and outgoing cars. Many of the present open squares will be excavated to the parking depth of one level of cars, and the upper deck will be covered with soil, grass and smaller trees. Many of the existing older trees are fortunately around the perimeter of the squares in London, etc., and so it will be possible to leave them undisturbed.

Cars will not be allowed to occupy the fairways of the thoroughfares. Each new large building will have to provide space within its own site to care for any cars that those people connected with the building desire to park for long periods. To speed up traffic on greatly used thoroughfares, pedestrians will have provided for them bridges or subways, often constructed of pre-stressed concrete. Certain very busy main roads will be double-decked, with traffic on two levels at the most important sections.

Railways, except the special lines for freight, will steadily be abandoned, and all that do remain will be electrified if they are beyond the range of a radiating energy station, or be replaced by *autobahns* with traffic-carrying pathways. All main railway-line entrances to major cities will be covered with a roadway, thus forming the needed entrances and means of exit for vehicles from the centre of cities to the open country beyond.

Between large centres of population, wide double and mostly straight *autobahns* will be built, providing special lanes for heavy traffic—i.e., large trucks with one or two trailers, and buses—and also essential lanes for private cars and non-freight carrying vehicles. Heavy traffic would be capable of going from door to door with its load without this being rehandled, as so often is now the case. Along the more vital heavily used *autobahns* there will be a wide central division,

above which will be constructed a high-speed (even up to 200 miles per hour) track for carrying a coachlike bus on a monorail, thus expediting the handling of certain perishable freights and large crowds of passengers. These traffic arteries will have *no* level crossings and will be approached by clover-leaf ramps.

It seems likely that private cars will progressively become smaller, and buses will carry the larger groups of people.

All road vehicles will pick up their energy, i.e., their propellants for travel, just as they now pick up their radio news, from large central power-generating stations. Equally, every car will have a wireless telephone, a connection with an exchange capable of giving long-distance service—possibly over a radius of 200 miles. All cars, buses and lorries will be in constant radar communication with such exchanges, as aeroplanes are to-day. Such means of oral communication will be insisted upon to an increasing extent, and in time pedestrians too will carry these 'walkie-talkie' telephones that can convey messages over long distances.

Coal, petrol, diesel oil and nuclear reactors will be constructed to provide power for vehicles such as motor cars and lorries, which will not carry propellants themselves. So henceforth the danger of fire will no longer exist.

Air travel too will change. Aeroplanes may not get much larger, but runways will slowly be abandoned and aeroplanes will be made to rise and descend vertically. For long-distance flights they will travel at least at three to four times the speed of sound, and passengers for intermediate destinations will be shot off in self-controlling, jet-cum-helicopter small vehicles, which will convey them to their right landing places.

Power stations using transportable fuel, coal, oil, etc., will be erected over the source of their energy—that is at the head of coal mines, at the convergence of pipelines from oilfields, at nuclear reactor centres; and duplicate handling of fuels will be scrupulously avoided. These stations will be capable of interchanging their energy with others when required, and also of generating all the power needed for factories, offices, houses, flats and agencies of transports. Heat from the sun, energy from the hydrogen of the seven seas, nuclear power—all will be harnessed for man's benefit as the next hundred years are lived.

Many of the progressive developments I have referred to would be quite impossible to-day, but research and invention will care for this or provide better alternatives.

New materials, plastics, fabrics, nylons, will all be increasingly available to everyone.

I intend to make no comment on matters with a political significance, or on such developments as man-destroying ballistic missiles or inter-planetary satellites for, although of fascinating interest, they are not likely to have much effect upon the lives of normal men and women.

The under-developed parts of the earth capable of providing big rewards for development will be re-peopled by completely self-providing communities, transported there in groups numerous enough to be entirely independent of outside help. Such group-places will be readily accessible by radar and by

aircraft communication to the rest of the world, and will not be hampered (as is now often the case) by slow development due to lack of numbers.

The science of prefabrication will be universally applied, to a degree entirely beyond any existing provision, for all such subjects as ships, buildings, machinery, fittings and furniture—in fact all man-made objects. Mechanical tools and automatic devices will progressively enable workers to produce infinitely better results per hour, with less effort than is now the case. All prefabricated units will be on a modular-dimensional basis, and consequently interchangeable at the minimum of expense and time, and be available for express assembly wherever required. The infinite variety of such modular units will make it possible to create attractiveness and beauty by the use of the combinations that will be available.

The results of research in every field, whether in medicine, nuclear matters, agriculture, manufacture, etc., will all be sent (by international agreement) to central international agencies, from which any country can immediately obtain the latest and fullest information on every subject that will be beneficial. This interchange of ideas will permit all new knowledge to be turned to good, and will prevent any two groups from investigating the same subject at the same time. Vast changes affecting huge numbers of people will take place almost imperceptibly and suddenly will be appreciated. The welfare of mankind as a whole will become the purpose of all God-fearing nations.

Although the millenium will by no means have been reached by 2057, international relationships should be infinitely better, and more reasonable and co-operative than they are to-day. Knowledge of each other's activities will be easy, for with the latest aerial power of observation and the photographic recording facilities, it will be impossible for any nation to hide its activities from its neighbours. The manufacture of any destructive agencies will be instantly known and internationally condemned. So, too, a common language will aid this spirit of co-operation, mutual forbearance and willingness to aid and not destroy each other.

This spirit of mutual regard, inspired by the wave of art appreciation, will induce in human beings a readiness to be more co-operative and less aggressive towards each other; and it cannot avoid developing into a world-wide movement towards faith in the Creator—indeed, towards a tremendous religious revival, when man will not condemn man but respect him. By 2057 therefore it is more than likely that, irrespective of the faith to which any people or nation may subscribe, there will be among mankind on earth an intensification of the worship of God on a scale never before experienced.

At the conclusion of his Address, THE CHAIRMAN *proceeded to the customary presentation of the Society's awards. He first presented:*

The R. B. BENNETT EMPIRE PRIZE *of* 100 *guineas to:*

Benedict Enwonwu, M.B.E., *for his achievements as a sculptor, and his work in encouraging the development of African art*

[Keystone Press Agency

Mr. Benedict Enwonwu receiving the R. B. Bennett Empire Prize from the Chairman of Council

The next award, of a Silver Medal to Mr. G. P. Horscroft, *for obtaining the highest marks in the 1956 Ministry of Transport's Extra-Master Examination, was accepted from the Chairman by Mr. F. G. Carter, Official Secretary of the Government of Victoria, acting on behalf of Mr. Horscroft (to whom the medal will be presented in Melbourne)*

THE CHAIRMAN *then presented Silver Medals awarded for outstanding papers read during the past Session, to the following:*

For Papers read at Ordinary Meetings

G. L. Ackers, O.B.E., M.I.C.E. '*Plumbing*'

A. Hudson Davies, O.B.E., M.A. '*The Development and Use of Glass Fibres*'

Lt.-Col. E. C. Gould, M.A., F.I.L. '*Some Problems of Backward Adults*'

Professor N. W. Radforth, M.A., Ph.D. '*Peat in Canada and Britain: Economic Implications*'

W. M. Whiteman, M.A. '*The Caravan and its Impact on Society*'

For Papers read at Meetings of the Commonwealth Section

D. J. Finley. '*Art in Australia: Looking Both Ways*'

Roy Macnab. '*The Emergence of Afrikaans as a Literary Language*'

The following lecturers, who had also been awarded Silver Medals, were unable to be present to receive them:

Ordinary Meetings

Dame Ninette de Valois, D.B.E. '*The English Ballet*'

Commonwealth Section

Otto Holden, B.A.Sc., C.E., D.Eng. '*The St. Lawrence River Power Project*'

Finally, THE CHAIRMAN *presented the* SIR FRANK WARNER MEMORIAL MEDAL *to:*

Miss Jeanette Tee, of Morden, Surrey, *for the best design submitted in the textiles sections of the 1956 Industrial Art Bursaries Competition.*

The winners of the following awards were unable to be present to receive them:

The HOWARD PRIZE of £50 *for a treatise on Motive Agents:* A. E. Johnson, D.Sc., M.Sc.Tech., M.I.Mech.E., *for his treatise on 'Turbine Disks for Jet Propulsion Units: An Account of Work of the Disk Panel of the Ministry of Supply, Gas Turbine Collaboration Committee, during the years 1941–49'*

The FOTHERGILL PRIZE of £20 *for Fire Prevention or Fire Fighting:* Philip B. Smith, B.Sc., *for his essay on 'A New Method of Suppressing Fires in Mines'*

A Silver Medal awarded under the THOMAS GRAY MEMORIAL TRUST: Alexander Wood, *for a deed of outstanding merit at sea*

DR. R. W. HOLLAND, O.B.E., M.A., M.Sc., LL.D. *then said:*

Ladies and gentlemen, We cannot allow Sir Alfred Bossom to leave this room before he has received an expression of our thanks for the Address we have just heard. I am reminded of the words of the prophet Joel: '. . . your old men shall dream dreams, your young men shall see visions'. Which is Sir Alfred? He is not a young man. But the remarkable glimpse of the future which he has given us is no mere dream; it would seem to follow, therefore, that he cannot be an old man either. Let us think of him simply as a man not afraid to reveal his vision of things to come, and be grateful to him for allowing us to share in it.

The vote of thanks was carried with acclamation and, THE CHAIRMAN *having thanked the meeting, the formal proceedings ended and the company adjourned to the Library, where tea was served.*

PRESENTATION OF THE NEW LECTURE BENCH, THE BICENTENARY MEDAL AND AN R.D.I. DIPLOMA, WITH THE MASTER'S ORATION

At a Special Meeting of the Society held on Thursday, 7th November, 1957, with

His Royal Highness The Duke of Edinburgh, K.G., K.T.,
President of the Society, in the Chair

SIR ALFRED BOSSOM, CHAIRMAN OF COUNCIL, *opened the Meeting with these words:*

Your Royal Highness, My Lords, Ladies and Gentlemen,

We are all extremely proud to welcome Your Royal Highness, our President, and most sincerely appreciative of your coming here to-day to be with us. It is one thing to be an ordinary busy man and quite another to be Your Royal Highness with all your great responsibilities. Yet you have found the time truly to interest yourself in the Society's affairs, and to honour this meeting. Thank you, Sir, very much indeed.

HIS ROYAL HIGHNESS THE PRESIDENT *then said:*

I see by the programme that I am expected to 'hand over' this lecture bench. But—it is already here! I hope it looks as nice to the audience as it does from this side. My only responsibility for it is this: when I came here once it seemed to me that a Society interested in the development of arts, manufactures and commerce would do well to show a good example. I should like to congratulate Professor Russell on his design, and Messrs. Gordon Russell Ltd., for making it; and also Messrs. Leevers-Rich & Co., Ltd., for putting in all the gadgets.

I had a first look at the bench this morning, and I think we rather missed the boat, because the other day, you may remember, the Queen and I went to the U.N.O. building, and there the lectern which people use to address the general assembly is moved up and down by electricity. This one, I am afraid, is still hand-draulic! I think this comparison, and the fact that this Society was satisfied for so long with a rather 'tatty' piece of furniture, illustrate to a certain extent a general weakness in this country: the conception of an article is good, the execution of it is good, the engineering is excellent—but in some strange way it fails to take advantage of all the most convenient gadgets for the comfort of the person who is going to use it. I think that this Society can do a very great deal to make the results of manufactures comfortable to use and convenient for the consumer. So here you are—this is my contribution.

[*Fox Photos Ltd.*

'But—it is already here!' His Royal Highness The President and the Chairman of Council

THE CHAIRMAN OF COUNCIL *then said:*

Sir, We are very sorry that we have not done as well with the lecture bench as they have in the U.N.O. building! But may I say, having been there myself, that though the U.N.O. building has got some good qualities, they are not *all* so good!

Sir, on behalf of the Council and the Fellows of the Royal Society of Arts, I should like to thank you for your great generosity. The calls that are made upon you for contributions are probably unlimited, and yet you have been most generous to us. We are very proud of our beautiful new lecture bench and lectern, and we are going to commemorate Your Royal Highness's gift by a small plaque placed on the bench itself. We are particularly appreciative of the bench as an example of English craftsmanship. I think, looking over the world to-day, that British craftsmanship is one of our greatest assets. This is a simple example of what we can do.

Sir, I now have the honour to propose a resolution expressive of our gratitude in the following terms:

> 'That the Council and Fellows of this Society, being privileged to receive from the hands of His Royal Highness, The Prince Philip, Duke of Edinburgh, his gift of a new Lecture Bench, and being deeply sensible of the honour thus done to them, do hereby respectfully express to the President their gratitude for this mark of his favour'.

The resolution was carried with acclamation, and His Royal Highness then accepted a copy of the text of the resolution inscribed upon vellum.

PROFESSOR R. D. RUSSELL, MASTER OF THE FACULTY OF ROYAL DESIGNERS FOR INDUSTRY, *being then called upon to introduce* MR. MISHA BLACK, *said:*

Your Royal Highness, Sir Alfred, My Lords, Ladies and Gentlemen,

I have the honour to present to you to-day a single designer for the award of the distinction of Royal Designer for Industry, Mr. Misha Black. This most able designer is already distinguished not only for the impressive quality of his work, but for its range and scope. Interiors, their furnishing and equipment, engineering products of every kind from pumps to diesel electric locomotives, exhibitions—all these come within his orbit and in all of them his work is outstanding. The high standard of exhibition design in this country to-day is very largely due to him. He is, in fact, the complete designer for industry; his varied work is always efficient, sensitive, inventive and impeccable. It gives me the greatest pleasure that it falls to my lot to-day to welcome and present to you Mr. Misha Black.

HIS ROYAL HIGHNESS *then presented to* MR. MISHA BLACK *the Diploma of Royal Designer for Industry.*

THE CHAIRMAN OF COUNCIL *next introduced* SIR ERNEST GOODALE, *the recipient of the Bicentenary Medal for* 1957. *He reminded the Meeting that this award was instituted in* 1954 *as a permanent commemoration of the Society's Bicentenary, and is given annually 'to the person who in a manner other than as an industrial designer has exerted exceptional influence in promoting art and design in British Industry'; and in calling upon Sir Ernest to come forward, The Chairman said that he knew His Royal Highness and all those present would agree that the 'right man' was receiving the award, 'and at the right time'.*

HIS ROYAL HIGHNESS *thereupon presented the Bicentenary Medal to* SIR ERNEST GOODALE.

[*Fox Photos Ltd.*

His Royal Highness presenting the Bicentenary Medal to Sir Ernest Goodale

PROFESSOR R. D. RUSSELL *was then invited to deliver his Oration, and began with these words:*

Your Royal Highness, Sir Alfred, My Lords, Ladies and Gentlemen,

May I begin, Sir, by thanking you for your most gracious remarks about the design of this bench and lectern? With your lucid and inspiring specification, and this quality of making, it can only be the designer's fault if they don't work, and with my fingers firmly crossed I submit myself to the poetic justice of being a guinea-pig.

The following Oration was then delivered:

QUALITY

By R. D. RUSSELL, F.S.I.A.,

Master of the Faculty of Royal Designers for Industry and Professor of Furniture Design at the Royal College of Art

It is as Master of the Faculty of Royal Designers for Industry (in which you, Sir, have shown so sympathetic and encouraging an interest) that I have the

great honour of speaking to you to-day. In this capacity it seems to me inevitable that I should take as my subject some aspect of our corporate trade of designing. I have become more and more convinced that, in this country, too much attention has been focused on appearance and too little attention given to quality, without which design can have no real distinction. It follows that quality, being so closely related to design and being also to some extent my obsession, should become my natural choice of subject for this paper.

When I came to discuss this rather uncompromising title with Dr. Luckhurst, I was reminded by him that in 1933 the late J. A. Milne had delivered his inaugural address as Chairman of the Council of the Royal Society of Arts under this same title. Far from being deterred by this coincidence, I was greatly encouraged by it. Having now read Milne's paper many times and with the greatest admiration, I am quite sure that the subject was so near to his heart that he would have been the first to welcome its restatement. My little tune becomes a variation on his theme.

As Chairman of the Council in 1933, J. A. Milne was greatly concerned with the exhibition of British Art in Industry to be promoted in 1935 by the Royal Academy in conjunction with the Society. Later he was to be virtually responsible for the founding of the R.D.I. Faculty.

I believe that the demand for quality as the over-riding requirement of a fine product, which was the theme of his address, was made with both the 1935 exhibition and Designers for Industry in the forefront of his mind; I believe that he wanted designers to be fully aware of the importance of this requirement and the exhibition to benefit from their awareness. Milne's fear that quality might be on the ebb in Britain in 1933 was important and prophetic.

At this stage I must try to define what I mean by quality. It is, in fact, difficult to define though very easy to recognize; its presence or absence in a building or a chair or a pair of shoes is immediately apparent to anyone who is interested in these things. Quality is something beyond functional efficiency and durability. It is a degree of excellence, an essence of right-making without affectation or contrivance but involving the sensitive consideration of material and finish and process. It comes of the assurance due to skill and of the freshness due to accurate speed which is a part of skill. It has dash and elegance and is a wholly delightful characteristic capable of giving great pleasure for centuries. It is almost entirely separate and distinct from design on paper and yet of the utmost importance to a designer.

David Pye, a very good designer and maker of furniture, in an admirable paper on craftsmanship, has pointed out that the French origin of the word 'design' is not '*dessiner*—to draw' but the obsolete '*designer*—to intend'. A designer is a man who has an intention which is normally conveyed to someone else to execute. The quality of the result is in the hands—often literally in the hands—of the executant.

A good designer will consider every detail of his intention before attempting to convey it. This full consideration is his contribution to quality, and by it he meets the executant half way: but in the final realization quality is still entirely

in the hands of the maker; if the designer does not know the maker he can have no certainty that quality will in fact be achieved. Incidentally, this underlines the importance of an industrial designer working in the closest possible co-operation with actual production.

A good designer with the necessary authority may be able to insist that skilled executants are found or even specially trained to give his work the quality he wants for it. Mies van der Rohe demanded from the bricklayers employed on his buildings for the Illinois Institute of Technology a degree of precision to which they had been quite unaccustomed since the times of their apprenticeship. A great deal of brickwork was rejected and strikes constantly threatened, but eventually these men accepted the challenge of the designer's exacting standards and regained the skill to meet it; they are now the aristocrats of their trade and proud to choose jobs to match their skill.

A bad designer possibly muddled about his intention and probably, through ignorance of process, even more muddled about the details of it, is unlikely to convey it in such a way that the executant, however brilliant, can give it quality. Indeed, he may well make it impossible for the realization of his intention to have any quality whatever.

It follows from all this that the best work should come from a skilled executant who is also a skilled designer, for he can have no problem in conveying his intentions to himself. But the artist-craftsman (whose unfortunate name recalls the definition of a gentleman-farmer as someone who is neither a gentleman nor a farmer) seldom has in fact the combined skills of designing and making both on the highest level. Too often he is not only rooted (as he should be) but totally buried in the past. However, I wish most sincerely that many more artist-craftsmen of balanced ability and contemporary outlook were working to-day (and that they would find a new name for themselves); they could set a standard which would stimulate all of us.

I have tried to make it clear that quality comes from skill in making—in fact from craftsmanship, by which of course I do not mean only making by hand, but making by any available and suitable process—hand or machine. Let us consider the applications of craftsmanship which produce quality. Firstly, there is that vast range of products made as a matter of course by craftsmen using for the most part hand tools: things which are either particularly suitable for making by hand or give very much better performance if made by hand than by fully mechanized factory processes. No designer is involved in these because the design is essentially traditional and evolutionary—over the years it has undergone only minor changes due to developments in materials or techniques. Examples are agricultural baskets, gloves, men's shoes, men's suits, hand tools of every kind, musical instruments, sporting gear of every kind—saddlery, guns, fishing rods, cricket bats. There are many others; all are in the great tradition of British craftsmanship which is perhaps the finest in the world; many have fine quality. The men who make these things are mainly responsible, along with the engineers and technicians, for the great reservoir of skill which survives in this country.

Another application of craftsmanship involves the making of expensive exclusive furniture or glass or silver as special commissions. Both craftsman and designer are concerned. For the designer there is everything to be said for working occasionally in this way; he can let himself go with the minimum limitations of cost or process and he may be to some extent a partner in the realization of quality. I am sure that this close co-operation with a skilled executant provides the best possible stimulus to a designer for industry, which brings me to the third application of craftsmanship as a source of quality in quantity produced goods.

In industry the craftsman's rôle is entirely different from those already discussed. It is indirect. He may be making prototypes, but their effect on the quality of the final product is negligible. He may be making jigs and tools and in this case his skill, even at second hand, may give the mass-produced product some quality. But if a really first-class craftsman has the opportunity and the ability to control the production of, for example, a highly mechanized furniture factory his influence can be tremendous. He will know what he wants from his mill and will not for one instant tolerate inaccurate work. Being himself skilled, he will not over-rate his labour, and will see to it that shortcomings in the skill of an assembly shop are balanced by perfect machining. He will always apply the touchstone of his high standards to the finished product. This picture is not imaginary. I know very well a factory to which it applies, and the furniture produced there certainly has fine quality.

I have said that Milne's thesis was prophetic in 1933. To-day in Britain, because society has missed the opportunity of finding contemporary applications for them, some crafts—once great sources of quality—have in fact disappeared. Twenty-five years ago there were in the Cotswolds a few old masons who could build a fine rubble stone wall. Now there are none. Twenty-five years ago it was obvious that this craft was dying: the old men were going and no young men were getting themselves trained for what appeared to be an obsolete trade. Modern architecture, then obsessed with hard synthetic materials—concrete and glass—had no use for rubble masonry. Now architecture has developed a kinder idiom; natural materials and interesting textures are in demand; but the masons who could help to provide them no longer exist.

In other vanished skills the direct contemporary application is not perhaps so clear. What use can modern society find for a wagon builder? But the sorry fact remains that the bell which tolls for the mason and the wheelwright tolls for all craftsmanship which, by their loss, is that much nearer to extinction. Their loss diminishes all quality and is Mankind's.

In the autumn of 1932, just twelve months before J. A. Milne's address, an important exhibition of British Industrial Art was staged in the Museum of Art and Industry in Copenhagen. It included examples of all the applications of craftsmanship I have already mentioned: handmade things to anonymous traditional designs, exclusive things more or less handmade by craftsmen, and the quantity-produced products of industry. It was an unqualified success and is still talked about in Denmark. Professor Steen Eiler Rasmussen, a most

distinguished Danish teacher and critic, and an Honorary Royal Designer for Industry, chose the things for this exhibition and said about it:

> The programme is to show samples of typical British things made from noble materials, showing technical perfection, superior design and the highest quality. Objects created by the English are now classical expressions of the white man's culture.

And again:

> It is astonishing to see how many English luxury goods achieve fame and can be sold at high prices without in any way being showy, only because they satisfy the demands for perfect comfort and high-quality craftsmanship.

And again:

> To-day's democracy has much to learn from aristocratic England's simplicity. There will always be things which demand high quality and fine craftsmanship, and when this is constantly aimed at improving the suitability of the object and not trying to make it look expensive then it is also an example for the machine-made thing.

Always the emphasis is upon quality. At that time, in 1932, the prestige of British quality in Europe was tremendous. Because it bore the magic brand 'made in England', a Danish small boy was as proud of his bicycle as his father was of his Savile Row suit. Quality was something the Danes understood and loved. The late Professor Kaare Klint, also an Honorary R.D.I. and a Dane who, through his teaching and his pupils, has probably had more influence than anyone else in the last hundred years on the design of furniture throughout the world, always refused to criticize furniture on appearance. Function and quality were for him the only valid standards of criticism.

From the standard of quality so vividly demonstrated in the 1932 British Exhibition in Copenhagen, through the teaching of Rasmussen and Klint largely based upon this standard, through the work of Hans Wegner and Borge Mogensen who were Klint's pupils, the best Danish furniture, made by hand and by machine, has come to be accepted as the best in the world. A great deal of it is exported, particularly to the United States.

Two years ago there was another British exhibition in Copenhagen, and the less said about Danish reactions to that the better. The gist of the unanimous criticism was that British manufacturers had lost all feeling for quality. Admittedly this was a trade exhibition and did not include examples of the hand-made crafts which contributed so greatly to the success of the 1932 exhibition. It is probable that even now an impressive showing of such things could be made, but they would be very largely the same things all over again. What the Danes have done with such wisdom, and what we with a few honourable exceptions have failed to do, is to apply the craftsman's standards of quality to goods made by modern industrial processes. It is a sad business and is due to designers' pre-occupation with appearance no less than to the complete lack of any feeling for quality on the part of many of the financiers and accountants

who control modern industry. Over the last twenty-five years we have missed the moral of our own story.

You will by now, I hope, realize that this is a matter very close to my heart, as it was to J. A. Milne's. Let us refuse to accept the ghastly implication in this age of the common man that everything must be available to everybody and in consequence second-rate. There is still room for first-rate quality in the most expensive and in the most humble fields. Let us, before it really is too late, do everything in our power to rescue our splendid tradition and to make intelligent use of our remaining crafts to revive the prestige of British quality in machine-made as well as in hand-made things.

At the conclusion of the Oration, THE CHAIRMAN OF COUNCIL *said:*

Professor Russell has described a situation the implications of which are vital for everyone of us. He has spoken very frankly, and I hope that his words will reach a far wider circle than this room. If we cannot maintain the great quality of British work we are not going to be able to keep the position that we have held for a very long time. It is up to all of us. We have the mechanics, the craftsmen, the designers. Let us inspire and encourage them in every way we can.

Sir, with your permission, I would propose a warm vote of thanks to Professor Russell for his lucid and inspiriting address.

The vote of thanks was carried with acclamation.

Finally, THE CHAIRMAN OF COUNCIL ***again addressed*** HIS ROYAL HIGHNESS THE PRESIDENT:

Sir, in attempting to thank you for your presence here this afternoon, I know that I speak for everyone in this room when I say that we have looked forward immensely to your visit, and that we are all deeply grateful for the part Your Royal Highness has added to our proceedings. Your candour and frankness, and the spirit which you put into everything you do, command a nation-wide respect. Though I can guess how very busy and fully engaged Your Royal Highness is, may I express the hope that you will be able to honour us by presiding here again before very long?

The vote of thanks to HIS ROYAL HIGHNESS *was carried with acclamation, and the meeting then ended.*

BADEN-POWELL AND THE BOY SCOUTS

The Peter Le Neve Foster Lecture by

THE RT. HON. LORD ROWALLAN, K.T., K.B.E., M.C., T.D., L.L.D.,

Chief Scout, delivered to the Society on Wednesday, 13th November, 1957, with The Rt. Hon. Lord Baden-Powell of Gilwell in the Chair

THE LECTURE

When a man achieves world-wide fame in two entirely different careers it is profitable to consider the background of his life, and to study even briefly the stages of the passage from the one to the other. Robert Baden-Powell—to be known all over the world as B.-P.—the centenary of whose birth Scouts and Guides celebrate this year, came of a stock on each side in whom ability was matched with a great diversity of interests. His father and his maternal grandfather were both Fellows of the Royal Society, both believed firmly in 'learning by doing' and the development of the inquisitive mind. It was a happy family, united in devotion to a remarkable mother who, left a widow with seven children, ranging in age from 13 years to one month, to bring up on moderate means, yet found time to play a considerable part in social work. There was in all their lives a simple but sincere religious faith, and when he was 8 years old Robert wrote on a scrap of paper, 'Laws for me when I am old', in which he propounded the philosophy which was to guide him through life. 'You must pray to God whenever you can but you cannot be good with only praying but you must try hard to be good.'

As we read the story of his life a pattern emerges which seems to lead inevitably to that Camp on Brownsea Island where, in 1907, he gathered together twenty boys from different environments to try out the ideas which had gradually been evolving, and which was to be the birthplace of the Boy Scout Movement.

Good fortune seems to accompany those destined for greatness, but it would be more true to say that greatness leads to full use of the opportunities that come their way. Apart from the mother's influence there was the discipline of his elder brothers, whom he accompanied on camping, canoeing and sailing expeditions. With them he learned the value of team work, of instant obedience and the experience of paying for his mistakes. On one occasion, when he put too much salt into the soup he was made to drink every drop of it himself. The financial stringency taught him the fun of improvising and making-do.

A scholarship to Charterhouse brought him under the influence of Dr. Haig Brown, a remarkable Headmaster who believed in the value of the individual; and with his help B.-P., by no means brilliant as a scholar or an athlete, learned

to make the best use of his talents, and out of seven hundred candidates for the Army Examination passed second for Cavalry and fourth for Infantry. He was commissioned direct into the 13th Hussars, then in India, and so started his long years of service in India and Africa.

His Commanding Officer, Sir Baker Russell, a most unorthodox soldier, encouraged the development of initiative in his young officers, even if it meant diverging from the Book. With B.-P. there were many diversions, but always with a purpose. He lived on his pay of £120 a year eked out by the sale of articles and sketches to the Press, and was able to take part in pig-sticking and polo through his skill in breaking and training raw ponies bought cheaply. In 1883 he won the Kadir Cup and another of his horses was in the final that same year.

When the Regiment moved to Africa his powers of observation and deduction, developed by his mother's early training, led to the capture of Dinizulu and a brevet-Majority. The wooden beads of Dinizulu's necklace are the symbol to-day of the system of Scoutmaster Training devised by B.-P. The Ashanti Expedition proved the value of the broad-brimmed hat as protection for his face in thick bush and protection for his neck against the sun, while the wooden staff was useful for testing the swamps. He became brevet-Lieutenant-Colonel. The Matebele Campaign convinced him of the need for every soldier to be able to work on his own and earned him promotion to brevet-Colonel, by which he became automatically senior to his own Commanding Officer and returned to India to command the 5th Dragoon Guards.

General Sir Bindon Blood was another unorthodox soldier, and the young C.O. received every encouragement in a revolutionary scheme of training and, eventually, persuaded the authorities to grant a special badge for Regimental Scouts—the arrowhead of the Scout Badge to-day. Smartness on parade, efficiency in the field, freedom from crime and ill-health among his men were proof enough of his success. He wrote a military training pamphlet, *Aids to Scouting*, and was selected to raise two Regiments of Mounted Infantry in South Africa when war seemed inevitable. The enemy net closed round Mafeking, and the last mail to leave the town included the corrected proofs of *Aids to Scouting*. His defence ranks with the greatest examples of personal leadership in history. In itself a comparatively unimportant action, strategically, and even more psychologically, it was vital. He became a national hero and on relief he was promoted Major-General at 43. When manpower became desperately short Lord Edward Cecil raised a Corps of Boy Messengers whose courage, keenness and determination were a revelation. Given the opportunity the *Boys could do a Man's job*.

In 1903, after organizing the British South Africa Constabulary, he returned to his own country as Inspector-General of Cavalry, and was invited by Sir William Smith, founder of the Boys' Brigade, to take the salute at their annual rally in Glasgow. It was the first time he had seen boys *en masse*, seven or eight thousand of them. What a challenge! He heard that many school teachers and brigade officers were using *Aids to Scouting* and he discussed with Sir William a broader basis of training to make it attractive to yet more boys. They became

great friends, and finally Sir William persuaded B.-P. to write a new book for boys along the lines of *Aids to Scouting*. The opportunity came in 1907 when his term as I.G.C. expired; the camp at Brownsea Island proved the rightness of his ideas and he wrote *Scouting for Boys*.

The book was published in fortnightly parts, starting in January, 1908. Boys all over the country bought it and appeared with their own little gangs, strangely dressed, under the lamp-posts and at the street corners. Sometimes they had a grown up who had collected two or three of these gangs or had, more likely, been collected by them.

B.-P. did his best to persuade others to take this mass of boys under their wing, but eventually he was forced to recognize that, whether he wished it or not, the boys themselves had started a new movement. While Pearson's were pushing out new editions the book was finding its way abroad. In May, the first collected edition was published, but it had already reached Canada, Australia and South Africa. Chile had been the first foreign country to come under its spell. It might, of course, be a flash in the pan, but an office was hired and six Scout hats ordered—and sold. In the Autumn of 1909 B.-P. was appointed K.C.V.O. Numbers were already estimated to exceed 100,000. In 1910 King Edward VII granted a King's Scout Badge and joined with Lord Haldane and Lord Kitchener in persuading B.-P. to resign from the Army and concentrate on the Scouts. In 1911 the first Rally was held before King George V. Twenty-six thousand, including a number from overseas, took part. In 1912 a Royal Charter was granted, placing the control of the Movement in the hands of the Chief Scout and a Council. Fancy a Royal Charter after four years! In 1913 a Scout Exhibition at Birmingham brought together representatives from about a dozen different countries.

In 1914 war broke out. Leaders left for the Forces, but the boy Patrol Leaders carried on and the Scouts undertook watch duties on vital points and round the coasts. They won the highest praise. The boys had founded Scouting and in this first great crisis it was the boys who saved it and, indeed, brought it out of the war stronger in numbers and in quality and, above all, in public regard.

In 1919 the gift of Gilwell Park on the edge of Epping Forest made possible a centre for training Scoutmasters and at the same time a camping site for the boys from East London. This estate is now the centre for the World Training Team. In 1920 the first Jamboree took place at Olympia in London, and not only were all parts of the Empire represented but twenty-one other countries as well. Scouting covered the world, and B.-P. was spontaneously acclaimed by the boys 'Chief Scout of the World'. It was also at Olympia that the germ of the International Conference first took shape and International Scouting was really born. By 1922 there were over one million Scouts in the world, in thirty-two countries. By 1929, when the Coming-of-Age Jamboree was held, and he became a Peer, the number had grown to 1,871,316 in forty-one nations of the world and thirty-one parts of the British Empire. By 1937 the Movement had still further expanded to 2,812,000. In that year, too, he received the Order of

Merit, a token not only of his own greatness as a man but indirectly of the greatness of the Movements, Scouts and Guides, which he had founded.

By 1939 Hitler's war had begun. For some reason the Scouts were not used under their own Patrol organization, as in 1914, and no boy under 16 was officially allowed to take part. Naturally they were not going to be left out; and the opportunity for service came early when, owing to the spread of radio, the Navy and the Merchant Navy found themselves critically short of visual signallers to provide ship to ship communication in the convoys under conditions of radio-silence. An urgent message was received at our Headquarters and the immediate needs were met, many of the boys remaining in this job throughout the war. 'A Scout's Honour is to be trusted', but I fear that a good many boys had forgotten their birthdays and, after the evacuation of children from the vulnerable cities in which they took a major share, they joined up with the Civil Defence Services either officially or unofficially and won the highest praise for their courage and cheerfulness. Wardens said of them that where the blitz was at its worst there they were to be found, treating the casualties and rescuing the victims. But for their example grown men said they could not have carried on with their own jobs. Many gave their lives, many more were wounded, but they wrote a page in the history of Scouting which will be an inspiration for generations to come.

The same thing was taking place in the occupied countries of Europe and Asia. In prisoner of war camps and concentration camps Scouts kept their Promise 'to help other people at all times', and by their example kept the will to live alive where life seemed without hope or meaning. The flame flickered but never died. Many young fellows who had never been in the Movement received their first introduction to it in such places and secretly organized training courses, so that when the war was over they might help with the work.

Meantime, B.-P. had 'gone home'. He died peacefully on 8th January, 1941, and was buried in a grave looking out over Mount Kenya, beloved and mourned wherever men value freedom.

As the war dragged on, evacuation, the black-out, the calling up of leaders, the destruction or requisitioning of halls and meeting places, restrictions on camping, shortage of training materials and rationing, added immensely to the difficulties of those who were trying to carry on. Numbers fell till 1942, and then to the great credit of all concerned and particularly of the young Patrol Leaders carrying on by themselves, numbers began to mount again. The fathers and mothers rallied round and, although in many ways standards dropped, Scouting remained a lively force.

Lord Somers became Chief Scout, as B.-P. had wished, and appointed a Post-War Commission in 1942 to discuss the problems to be met and the best way to tackle them. By the time peace returned Lord Somers himself had died, but the work that he had started bore fruit and the Movement has continued to expand.

Throughout the war, in spite of shortage of staff, contact had been maintained with the Commonwealth and Empire, information of developments was passed on to them and much encouragement was derived from this interchange.

Many foreign governments had their headquarters in London, and regular meetings were held with Scouts in their service to discuss plans for helping their rehabilitation after their liberation. In most of these countries Scouting, under a strict ban, had multiplied many times in numbers. It had been an adventure with life itself at stake. The Jamboree of Peace in 1947, so soon after the Victory, was a great achievement on the part of French Scouting.

Gradually restrictions were removed, but the shortage of meeting places remained, and in some places remains to-day, an almost insuperable obstacle. In many of the new housing estates no provision was made for recreation and, even where sites were available and the Groups had earned the money to make a start, building bye-laws insisted on standards of brick-building which would cost four or five thousand pounds; in the majority of places, however, we receive every encouragement. It seems a tragedy that boys should be deprived of the benefits of Scouting because of bureaucracy and red tape. Young men returning from the Services needed time to readjust themselves to civil life and their job. In cases where they came back too soon they were apt to leave again—often for good. The public gave magnificent support, and many of those who had carried on through the war remained in charge of the Groups till replacements could be found. The stream of younger men began to grow and the demand for training kept pace with the increase.

In giving this brief outline of the general development of Scouting, I have deliberately postponed any mention of the expansion into new fields, but it was obvious that in a seafaring nation Sea Scouts would want to 'muck about in boats', and later in an air age that 'Air Scouts' would be attracted by a bias towards aircraft and the skies. But it was early found that sisters, younger brothers and older brothers would insist on coming along. The Girl Guides, the Wolf Cubs, with their training based on Rudyard Kipling's 'Jungle Books' (which gave such scope for their love of animals and make believe), and the Rover Scouts, were the answers. Later, as the 15–18 year old wanted more real adventure the Senior Scouts were accepted as part of the Group or Family.

One of the most interesting new ventures was Scouting among handicapped boys, which has produced such remarkable therapeutic successes. Spastic, orthopædic, deaf, blind and even mentally defective boys have been given a new interest, a new incentive, to overcome their handicaps, and a new feeling of being in the world of normal boyhood. Obviously, certain tests are beyond them, but alternatives are provided only where necessary.

There are two main co-ordinating influences in World Scouting. First the International Conference, which consists of Delegates from all member-Associations. It decides policy, development and the admission of new Associations and elects the International Committee. The Committee meets every year, the Conference every second year. The Committee has a Secretariat, the International Bureau, under a Director whose duty it is to keep the Committee informed of developments and advise them on the position in any question at issue. The Bureau also has travelling Commissioners in Latin America and the

Far East to encourage Scouting in these areas. One or two more will be appointed as they become available.

The second is the World Training Team and the Wood Badge Training of Leaders based on the Patrol system under the Camp Chief at Gilwell Park. To Gilwell have come men and women from over a hundred countries to be trained and return to their own Scout Troops and Wolf Cub Packs and Training Centres to pass on what they have learned. Since the War, many new courses and techniques have been developed, and the Training Team now has branches in almost every part of the world, with American, Australasian, European, Asian and African members and Training Camps of their own, many of them named Gilwell after the original. The symbol of success in this training is the replica of the wooden beads from Dinizulu's necklace. After the recent Jubilee Jamboree some 460 men and women from fifty-one countries came to Gilwell.

Why is it that Scouting had such an immediate success not only at home but in so many different parts of the world and among boys of every colour, creed and tongue? The answer is to be found in the entirely fresh approach, using the natural instincts of the boys and guiding those instincts into constructive, not destructive, channels. Boys everywhere tend to form gangs under their own leaders to seek adventure and to do things for themselves. The Patrol is another name for the gang, and the Patrol Leader, trained by the Scoutmaster, is given the responsibility for the welfare, the discipline, and the training of his boys. He learns leadership by practice and soon discovers that it is not the stripes which give him authority but his own personal example, inspiring confidence in his leadership. Boys resent an order or a veto but will always accept a challenge. The Scout Law does not say 'you must tell the truth', nor 'you must not tell a lie'. All its clauses are plain statements of fact: 'A Scout's Honour is to be trusted'. No one has to be a Scout; it is purely voluntary; but if he wishes to claim membership he must justify that claim by accepting the Laws in his own life.

The Promise of Duty to God, and to The Queen (or his Country), to help other people at all times, and to obey the Scout Law makes the boy realize that duty goes with privilege. Duty to God comes first, because B.-P. knew that nothing of permanent value could be built on any other foundation. He knew that there was room for some common ground where all could meet without compromise to their own consciences and their own ways of life. By insisting on a belief in some Power outside and above ourselves, and yet leaving the interpretation of that Power to the boys' own conscience, he made it possible for Christian and Jew, Mohammedan and Buddhist to meet together in one family inspired by a common ideal. But a Scout cannot get away with some airy-fairy statement. 'Every Scout is expected to belong to some religious body and to attend its services.' The idea of service to others gives him a sense of importance and a self-respect which makes it easy to advance to a mutual respect and understanding which, in its turn, makes possible a concept of brotherhood with all mankind.

We make no attempt to produce Scouts in one mould. We aim to make them

responsible citizens and leaders in their own community. We teach them to have pride in their own traditions and their own way of life, to value the heritage they have received from past generations and try not only to preserve it but enhance it. There is no short cut to the Brotherhood of man. It must come from mutual respect. To achieve mutual respect there must be self respect. To destroy national pride is the surest way to 'I'm as good as you' instead of 'You're as good as me'. There is a world of difference between the two. When we meet we are prepared to learn from each other and bring the best of our own heritage as our contribution to the common pool.

We believe that hero-worship is necessary for the full spiritual development of man. Our Senior Scout Patrols are named after Drake and Raleigh, Scott and Wilson, Eric Liddell and Gino Watkins and others of that calibre. We prefer them to mould their lives on such people rather than on the latest film star.

The Badge System is based on different criteria from those in common use. They are not academic exercises but the practical learning by doing. There is what we call the basic training for manhood, the straight road from Tenderpad Cub to Queen's Scout, a progressive training of graded tests requiring considerable courage and determination over a wide field. Our Queen's Scouts, who receive Her Majesty's Certificate and message, have shown over and over again that, when they have completed this course, they are equipped with the will and the skill and the courage to tackle with confidence almost any emergency they may meet.

But in addition to this direct route, there are side-lines covering a great range of subjects, so that there is hardly a boy who cannot find something to suit his own taste and aptitudes. Success is based not so much on standards achieved as on the amount of effort expended in achieving that standard. Book knowledge is not enough in itself. Of course, it is impossible to find a Scoutmaster who knows all these subjects, but our Panels of Laymen willing to instruct and examine give us a fine service.

At our Headquarters in Buckingham Palace Road we have many different departments, each with a voluntary Commissioner to lay down policy and a full-time Secretary to carry it out. One of these is the Overseas Department, which maintains relations with the Commonwealth countries and controls Scouting, through more or less liberal Constitutions according to their stage of development, in the dependent territories. At the moment there are no Scouts in British Somaliland, but that is likely to be remedied very soon. We have them even in Nauru, Pitcairn Island and Tristan da Cunha. Another, the International, Department, deals with foreign countries. Eight thousand of our Scouts camped in twenty-one countries in 1956. The International Department was responsible for supervising the arrangements, notifying the receiving countries and also making arrangements for several thousand foreign Scouts visiting the United Kingdom. Yet a third important department is for 'Camp Sites', dealing with the dozen or so Headquarters Camp Sites, where many thousands of boys learn to camp each year, under the supervision of a Warden; but many counties have

their own camp-sites for week-end camping and, of course, most Troops have their annual camps on private property by permission of the owners.

Finance is always a difficult subject, and subscriptions nowadays are not so easily come by, but about 85 per cent of our annual budget comes from two main sources: 'Bob-a-Job', a special week being set aside for this, the boys doing jobs to earn money for our Headquarters and Group Funds; and the proceeds of the Scout shops, which have a turnover of about £400,000 a year.

A few years ago we carried out an investigation into why boys left, and what in the main, were their ages and reasons for doing so. It told us little new but it gave us facts, not just theories. One fact was that one quarter of our Wolf Cubs changed their homes every year, emphasizing the need of follow-up. Another extraordinary figure represented the number of boys who slipped in and out almost without being noticed.

A booklet, *Scouts of Tomorrow*, was published giving the facts and the conclusions. Already after barely one year of as yet only partial operation, some remarkable results have been achieved; for instance 13,500 more Wolf Cubs stayed on into their eleventh year, and other dangerous ages among the Boy Scouts and Senior Scouts have been made less dangerous. There is still much to be done, but it is at least a start.

It is wrong to lay too much stress on losses, so-called, at 17 or so. There are apprenticeships, evening classes, university examinations cutting into leisure, and it is natural for a boy at that age to readjust the use of his leisure to cater for his main interest. We can provide him with mountaineering, caving, canoeing, sailing, gliding, foreign travel and many other pursuits, but if we have introduced him through his Scouting to something which he can get on a higher or more concentrated standard elsewhere, we should be glad to think he is carrying the spirit of Scouting into a wider field. To imagine that we have failed because he leaves our apronstrings is a wrong attitude. We taught him to stand on his own feet, and that is precisely what he is doing.

Do we fail in other more important matters? The more I travel the better I appreciate the immense contribution Scouting has made in the past to the betterment of mankind. If democracy is to survive we need leaders at every level, in the Cabinet and in the little rural community, even in the home; in the board room and on the shop floor. We claim no monopoly, but in any community you will find that men who were once Scouts hold leading positions in civics and welfare work; in the professions, in the Churches, in business and industry to a disproportionate degree. Many will admit they learned the privilege and the responsibility of leadership as Patrol Leaders, so when responsibility was offered them they were not afraid to accept it, to take decisions and to stand by them.

I constantly receive stories from all over this country and the Colonies of boys who took the lead when adults were hanging back, in saving life, in dealing with a panic. One Chief Constable wrote how pleasant it was to find somebody (a 14-year-old boy) doing something and doing the right thing when he arrived at the scene of an attempted rescue from drowning. They know what to do and the urgency of action.

The job of a Scoutmaster is to plant a seed in a boy's heart. That seed may take long to germinate, but where a boy has once taken the Promise and been a Scout, the crisis in his life, which comes to all of us sooner or later, may well produce the flower. Of course, we have failures; they are the ones that are noticed; but we have a greater proportion of success than we often realize at the time. No greater tribute has, indeed, been paid to our success than that we have been the first of the free institutions to be suppressed by every Dictator.

Do we need to bring Scouting up-to-date? Each year more and more boys accept the challenge, and to-day with 561,000 Scouts in the United Kingdom, and over 8,000,000 in the world, we have again broken records. Of course, we vary our Badges from time to time. We shall, no doubt, add 'Space Scouts' in due course as we added Sea and Air Scouts, but the fundamentals remain as valid in 1957 as in 1907. Boys, thank God, still remain the same through the ages. Adventure, chivalry, the longing to be of use and to do things, are still theirs.

What of the future in this technological age? Surely, the qualities of the inquisitive mind; the power to observe, to discriminate, to deduce; the dexterity in handling complicated apparatus; the broad background of experience, to avoid getting ourselves into a rut; finally, the integrity which prevents us from deceiving ourselves and others; these are exactly the qualities which Scout Training develops and which research and technology demand.

Step by step B.-P. reached Brownsea Island. The acorn he planted has grown into a great oak which has spread its branches over the Free World. Many of you must have seen on your television sets the scenes from the great gathering at Sutton Park when, at the Jubilee Jamboree, 31,000 Scouts from eighty-seven different parts of the world, of every colour, creed and tongue, lived together as one family. There were no politics, no slogans, no hatred. There was no need to shout Peace, it was there for everyone to see in the hearts of the boys.

Teach us delight in simple things
and mirth that has no better springs;
Forgiveness free of evil done
And love for all men 'neath the sun.

DISCUSSION

MR. N. E. MUSTOE, Q.C.: I should like to ask Lord Rowallan what facilities exist for what one might call the ex-Scout group, the 18 to 30 year olds?

THE LECTURER: What we have done there is to hope that a good many of them, of course, will take out warrants and help us in Scouts. We do, I think, produce a higher percentage of our own leaders than any other youth movement; some 80 per cent of our 50,000-odd warranted Scouters come from our own and, of course, in the ladies' cases, the Guide Movements. There are plenty of other jobs that they can do: they can join the B.-P. Guild, which is now a world body, which gathers together Scouts and old Scouts who still wish to carry on in their daily lives the spirit that they learned in the troop, the pack, the crew; we have the Rovers for those between the ages of 17½ and 24; we have—a horrible name—Scout Auxiliaries who give regular service on camp sites, county and headquarters, and with various other jobs in which Scouting always needs to have help. We have also our Panels of Lay

Members, Badge Examiners and Badge Instructors, for those who cannot give regular weekly or fortnightly service but who can come to our aid in cases where we need their help on a less regular basis. I do not think there is any man for whom we cannot find a job in Scouting because his own particular talents do not fit in; we have such a wide variety of interests in Scouting that we can use them all.

MRS. JOHN HALL: I should like to ask Lord Rowallan if he could put over some of the very splendid talk he has given us on television, because I personally have seen only one programme about Scouting on television in this Jubilee Year. I was tremendously disappointed in it. The programme was concerned with boys, who were not Scouts, going on a visit to a Troop.

THE LECTURER: I can assure you, Mrs. Hall, that we were just as disappointed as you were! But I did not see that programme myself. At the same time I should like to pay a tribute both to the B.B.C. and to Independent Television for the quite magnificent coverage which they gave us at the Jamboree itself. It is interesting to know that they gave more hours than on any other programme in the history of the B.B.C. apart from the Coronation, which, of course, naturally took first place, and the Olympic Games in 1948. So we really have not done too badly, and it is interesting to know that, although in many cases the papers were exceedingly disappointing, the B.B.C. and ITV increased their programme hours by 50 per cent over an already very full coverage after the Jamboree began. It is quite extraordinary how frequently, one way and another, Scouting does slip into television programmes, Children's Newsreels and others; and, of course, we also have every year the parade at Windsor, superbly done by Richard Dimbleby and his associates, which we are very proud of.

MRS. G. E. MERCER: I should like to ask—although we know that it is a particularly non-political Movement—if the Boy Scouts have made any special efforts to prepare their members in countries like Ghana, which are becoming independent, for the new status of their countries?

THE LECTURER: I think that we have probably done more than almost anybody else to prepare the new nations for accepting their full responsibilities, and I saw only this morning in the Overseas Department a most delightful, charming and sincere letter from the Chief Scout of Malaya, paying tribute to the splendid help that they had always received from our Overseas Department at Headquarters in building the foundations of Scouting among their people, and so laying the foundations for the building up of their new nation to take its place in the world. I think that, although we are entirely non-political, we are doing a great deal to teach the boys all over the world and in our own country the value of integrity and service, which after all are the basis of citizenship.

THE REV. BASIL E. BENNETT: Would the Chief Scout kindly tell us a little more of the religious policy of the Movement? Is it a rule or is it expected that every Scout or Scouter be a practising member of some religious body? One or two of us rather suspect that people take office who do not have religious connections.

THE LECTURER: It is a rule. We have our Religious Advisory Panel composed of representatives of all the main denominations and the Jewish faiths; they help us with our religious policy. We are guided very largely by them; they meet at least every quarter at Headquarters. In addition to that, we have in almost all our counties a fairly full system of County Chaplains dealing with the main denominations represented in Scouting in each county; they are supposed to interpret Scouting to the Churches and to interpret the Church requirements of various different denominations to the Scoutmasters. They do a tremendous amount of work for us in smoothing out the little difficulties that appear when some foolish Scoutmaster takes all the choirboys away to camp at a most inappropriate time. This sort of thing does happen;

but we also encounter from time to time the clergyman who does not understand the importance of camping to the boys, and who also does not really understand the full build-up of the training that Scouting provides, and the development of the spiritual side that we are trying to help together with the physical side. Those two organizations, the County Chaplains and the Religious Advisory Panel, are the people to whom we look for guidance. You say that there are certain people who are given warrants who are not members of any religious organization: in these days, unfortunately, the Religious Advisory Panel themselves say to us, 'Don't exclude those who are genuinely seeking'. There are many very excellent people among them; they are finding difficulty in adjusting themselves. For them we hold 'Duty to God' Courses which declare the fundamentals of the Christian faith according to their own denominational allegiance. We have had many hundreds, in fact, I think I may say thousands, of young men and women through that Course—mainly by discussion, where they have an opportunity of clarifying their own ideas and their own thoughts—in the majority of cases finding out where they stand—and of passing from a faith in God, which lacks any firm ideas of where their duty lies and how they can serve Him, to be confirmed members of a Christian denomination. We believe that in the majority of cases this has worked out very well. I can see that you do not, but we should be very pleased to discuss this with you if you would let us know afterwards how we can help and how our County Chaplains' system can be improved.

MR. L. E. HALLETT, F.C.I.S.: May I ask Lord Rowallan if he would say anything about B.-P. House, which is the Memorial to the Founder of the Movement?

THE LECTURER: B.-P. House is in rather a depressing state at the moment. We launched an appeal at the beginning of the year; a previous appeal was made in 1942 and the Scouts, to whom it was confined, collected a sum which, with accumulated interest, now amounts to about £190,000. We were hoping to find—if possible to build—a house, The B.-P. Memorial House, which would provide hostel accommodation for the many thousands of boys who, as you heard, pass through London every year, and also the many young fellows who are coming on short courses. A place where they could meet together as well as find accommodation, knowing that other Scouts would be there. Then we also had the idea that we ought to have a museum there, for the historical documents of Scouting and the manuscript of *Scouting for Boys* and those innumerable trophies which B.-P. received from Scouts all over the world. We launched an appeal for £200,000—in addition to the £190,000 that we already had—at the beginning of this year in the hope that we might be able to erect the house, costing about £250,000 for which we already have a site at the corner of Cromwell Road and Queen's Gate, a house which would be worthy of the memory of the Founder and would provide for our needs. The surplus after building would provide an Endowment Fund, so as to provide accommodation at a price which these visiting boys can pay, amounting to about £130,000. Unfortunately, so far only about £90,000 has come in. We are launching local appeals at the present time but it looks as if it will take a long time, I am afraid, to reach the figure of £200,000 which we were hoping to achieve. I am afraid that the present is not a very good time for an appeal, but it has always been said by those who know most about appealing that there never has been a good time for launching an appeal!

MR. GEOFFREY G. YOUNG: I had the privilege to be at the Jamboree and it seemed to me there were more Scout hats in evidence among foreign contingents than our own. I regret this. I think the Scout hat was the symbol of Scouting, and now that the difficulties of wartime have passed it seems to me that the Scout hat is almost a symbol of the County Commissioner and senior people. Is it going to be allowed to disappear entirely from the British scene? My own experience in Scouting is that the Scout hat is smart, and it is the exceptional boy who can make himself look well in a beret.

THE LECTURER: I can assure you that I regret just as much as you do the passing of the Scout hat, but it became inevitable with the high cost of a hat of sufficient quality to last. It is no good expecting mothers to buy hats who, when their boys come back home after their first camp, having used them for other purposes than covering their heads, find that the hats have to be scrapped. But I think that a great many people found, like B.-P., that for going through woodlands, particularly by night, there is a great advantage in having a wide brim, and that it also acts as a useful gutter for throwing the rain clear of the back of your neck; whereas the beret directs it exactly to the place where it is going to cause as much inconvenience as possible. There are quite a lot of people coming round to that idea, and if only we could get the Scout hat made in a quality and at a price which we could really recommend I am sure that a great many would come back.

MR. GEOFFREY G. YOUNG: Why not have it as a privilege for the Patrol Leader, so that it does not disappear altogether?

THE LECTURER: That is an idea.

THE CHAIRMAN: Lord Rowallan has told us within the space of the last hour or so what would in fact fill volumes, because the idea of this game of Scouting obviously was coming to my father throughout the course of his long and adventurous and active life; and little did he ever realize during the course of that life what he had in fact started when Scouting began in 1907—that wonderful world-wide Movement whose Jubilee we celebrate this year. We wonder, too, where Scouting is going; we know it has an enormous future. We know well too, as we travel in the course of our day-to-day lives, that every other person whom we meet is or was at some time connected with the Movement; in fact, in this Hall to-day I see an enormous number of Scout badges, and I dare say that those of you who are not wearing badges in your buttonholes have probably been Boy Scouts or Girl Guides, or connected with the Movement in some way, during the course of your lives as well. And so, Lord Rowallan, we are most deeply grateful to you for coming here this afternoon and giving us that wonderful lecture. It must have taken you many hours of burning the candle at both ends to make it, and you have delivered it so forcibly and answered so clearly and distinctly those questions which have been asked. We do thank you, Chief, most warmly.

The vote of thanks to the Lecturer was carried with acclamation.

SIR ALFRED BOSSOM, BT., LL.D., F.R.I.B.A., J.P., M.P. (Chairman of Council of the Society): The Royal Society of Arts is concerned with many subjects, but I think this is one of the most human discourses we have ever had, and I am very glad that, through the medium of the Society's *Journal*, Lord Rowallan's words will spread all over the world. It has been of particular advantage to have had Lord Baden-Powell, who so ably carries on his father's great example, to conduct our proceedings, and I know that every one present will join me in thanking him warmly for coming here this afternoon.

The vote of thanks to the Chairman was carried with acclamation, and the meeting then ended.

EXPLORING THE DEEP OCEAN FLOOR

A paper by

A. S. LAUGHTON, M.A., Ph.D.,

of the National Institute of Oceanography, read to the Society on Wednesday, 20th November, 1957, with Sir Ernest Goodale, C.B.E., M.C., a Vice-President of the Society, in the Chair

THE CHAIRMAN: Our lecturer this afternoon is probably well below the average age of those who generally address the Fellows of this Society, but I think it is in keeping with the forward-looking spirit of our Royal President that we should enable a young explorer to tackle this subject of 'Exploring the Deep Ocean Floor'. After being educated at Marlborough and at King's College, Cambridge, where he was a scholar and took his degree in physics, Dr. Laughton did another three years' research under Dr. Maurice Hill, whose distinguished father some of us may remember. Dr. Laughton was then awarded the John Murray Research Studentship of Columbia University, New York, where his year's work included some sailing in the *Vema* to various parts of the West Indies, Mexico, the Azores, Spain and elsewhere. I understand that while he was in the United States our lecturer met Dr. Deacon, Director of the National Institute of Oceanography near Godalming, and as a result of that meeting Dr. Laughton was offered a post as a Senior Scientific Officer at the Institute. In that capacity he made several trips in the *Discovery II*. Two years ago Dr. Laughton took his Ph.D., on a geophysics thesis. It is a great pleasure to me to be in the Chair this afternoon, because Dr. Laughton's father and I have been friends for many years and have been associated together in various enterprises, particularly during the period between the two wars; and I am looking forward very much to hearing his son talk to us on such a fascinating subject. I believe in the course of it he is going to tell us about the camera which was used for his explorations, and that this camera is, in fact, his own invention.

The following paper was then read:

THE PAPER

'Let us remember, please, that the search for the constitution of the world is one of the greatest and noblest problems presented by nature'—GALILEO GALILEI

It was Aristotle who supposed the world to be made of four basic elements: earth, water, air and fire. Although this idea has long since been superseded, we can, nevertheless, usefully divide the surface of our world into these four constituents, rejecting, however, the last, since it forms so minute a part of the whole. If we consider the remaining three, earth, water and air, we can see that

they are present, not intimately mixed, but, on the whole, separated by well-defined boundaries, each of which is a domain requiring special study and presenting its own problems.

The boundary between earth and air is the best known of all. Man has lived for many tens of thousands of years on the surface of the land and has studied and explored a great many aspects of it, and to-day we are justified in saying that we know a great deal about it. We cannot claim complete knowledge, for there are great areas such as the polar regions as yet unexplored and many problems yet unanswered, but in comparison with the other two domains our knowledge of the land surface is very extensive.

The surface between air and water presents a different kind of problem. Here we are faced with a mobile surface acted upon by the forces of tide and wind, and one which man has been forced to study in order to be able to travel safely over it. But in spite of the thousands of years of practical experience in dealing with its moods, it still presents a potential enemy to all who venture on to it, or who live on its borders.

It is the third domain, however, that I want to talk about this afternoon; the ocean floor, where the earth and water meet to exclude all air and where man has seldom been. The deep oceans cover over two-thirds of the surface of the world, and yet more is known about the shape of the surface of the moon than is known about that of the bottom of the ocean. The dark abysses of the deep sea have always stirred man's imagination, but it was not until the end of the eighteenth century that the first successful steps of deep-sea exploration were made by sounding, using a weighted line. During the next hundred years an increasing number of expeditions took soundings and sampled the bottom in increasing depths of water. In 1840 Sir James Clark Ross made a sounding of 2,425 fathoms in the South Atlantic, this being the first truly deep sounding. This was made by allowing a weighted line to run freely from a large reel on one of the ship's boats and timing each 100 fathoms, a change of speed indicating the bottom. The small boat was necessary to minimize drift and thus to keep the line as nearly vertical as possible. The line had to be reeled in by hand, making such soundings extremely arduous. In 1871 the Royal Society and the Admiralty collaborated in organizing a circumnavigatory expedition in H.M.S. *Challenger*, to extend the scientific investigations of the deep sea to the more remote parts of the world. This expedition, which lasted from 1872 to 1876, resulted in a vast amount of information which now forms the foundation of nearly all aspects of modern oceanography. The cruise reports, contained in thirty volumes and occupying an entire shelf in the library, took twenty years to work up and publish.

Although the *Challenger* was equipped with a steam winch, a deep sounding still took several hours and consequently only the bare outlines of the shape of the bottom were obtained. To-day such a sounding is taken automatically every few seconds, using acoustic signals, as the ship steams along. On the other hand the techniques for dredging samples from the bottom have changed very little from the early *Challenger* ones. We still have to haul a heavy steel and wire basket over the bottom and we still run the risk of losing everything if the

dredge gets caught up. And to-day the operation still takes just as long. The remarkable thing is that in the eighty years since the *Challenger* expedition the number of species discovered on the deep-sea bed has not greatly increased in spite of the numerous expeditions which have been made.

Before I go on to talk about our modern techniques of deep-sea exploration, I should like to spend a few minutes considering what it is that we are trying to find out. In its aim, sea floor exploration is like continental exploration. The first thing that we want to know is the lie of the land. Are there mountains and valleys, plains and canyons? And if so, what is their shape, how big are they and where are they? Topographic surveying is extremely important and forms the framework on which the rest of the studies will be built. In this way we can divide up the sea floor into various regions, each with its own characteristic features and its own problems. All our other results will then be correlated with these regions.

The topographic surveys result finally in contoured charts and sections, but these cannot be detailed enough to give us an idea of what the bottom actually looks like. The second phase of exploration then is concerned with the scenery of the bottom as it would appear if the water were all removed and we could wander around at will. This is equivalent to eye-witness descriptions of what the continental explorer has seen and to the photographic records he has made. It is virtually impossible to reduce to a tabular or numerical form the infinite detail that makes up the scenery, and so the only records that can be made are inevitably photographic. With sea floor exploration, photography provides both the means of finding out and the record.

Important members of any exploration team are the geologist and the biologist. They can collect specimens that can be examined and analysed in the comfort of the laboratory and provide the scientific data necessary for a full appreciation of the environment. So with the sea floor, the collection of specimens is a major part of the exploration and takes us from the stage of observation into the stage of detailed analysis. We want to know what the sea floor is made of and how it came to be as we find it now. Not only do we want to know the composition of the surface layers, but we also want to know what lies beneath them and how far they extend. Here we come into the much more difficult region of exploration, where we have to rely on complicated and indirect means to give us the answers we want. Since it is impossible to have access to the great masses of buried rock strata that form the earth's crust beneath the ocean, we have to use sound waves as our messengers and depend on such information as the velocity of sound in the strata to give us a clue to their composition.

To describe these techniques this afternoon would take too long, but in principle they depend on the use of explosions in the sea to generate the sound waves, which are picked up by sensitive hydrophones and recorded after being reflected and refracted by the rock strata. These seismic methods, as they are known, are used extensively in oil exploration.

All these studies are interesting enough in themselves and in the data they provide that has immediate and direct application (such as, for instance, the

possibilities of oil accumulations under the oceans), but they are also clues in the much more far-reaching problems of why the ocean basins are as they are to-day; when they were formed, how they differ from the continents they surround and whether they are changing. There have been in the past great arguments about the geological history of the oceans, and even to-day there are several opposing theories based on evidence from widely differing sources. Many people have noticed the fact that if the continents could be moved around like pieces in a jigsaw puzzle, they could be combined into a comparatively solid block by bringing America eastwards to the coast of Europe and Africa, the Antarctic and Australia up into the Indian Ocean. The theory was developed by Wegener that the continents did in fact start as a block together on one side of the earth's surface and that subsequent forces (whose origin is obscure) moved them to their present positions. Wegener postulated that all this took place in the comparatively recent era of the Cretaceous—that is, only a hundred million years ago, as compared with the age of the earth of three thousand million years. We do not believe to-day that such major movements of the earth's crust could have taken place so late in its life. The geophysical evidence obtained from our exploration of the ocean floor suggests that the oceans of the world are much older than this and have not altered radically since the crust of the earth cooled and solidified. Furthermore, there appears to be no major difference between the structure of the crust under the Atlantic and that under the Pacific, as one would expect on the continental drift theory. I have not the time here, however, to go into all the interesting theories about the history of the ocean basins, and more conflicting evidence is even now being obtained from measurements of rock magnetism. I have mentioned just one theory to illustrate how the results of geological investigations of the ocean floor are so vital in helping to solve the problems of crustal history.

The last field of study that I have already mentioned is the biological one. I will not say much about this, since I do not claim to be a biologist and cannot assess the problems accurately. But in my own particular field of deep-sea photography I have been faced with examining and identifying the various animals and fishes that have appeared in the pictures. Our knowledge of the bottom-living fauna of the deep-sea has hitherto been limited to the results of dredge hauls in which all sorts of specimens—animals, rocks and mud—are brought up mixed together and frequently damaged. Photographic studies and direct observation (when this is at all possible) enable us to see the fauna in its own environment. We can study the way it lives, its movements and postures, and the tracks and burrows that it makes, all in an undisturbed state. We may even discover new species that have escaped the dredges or which are perhaps too big and too fast to be caught by conventional trawls. There is always the fascinating possibility of observing the monsters of the deep that have captured the imagination of so many authors—the giant squid or the sea serpent.

I have said enough about what we are trying to do when we explore the deep-sea floor: I now want to examine how we go about it and what we have found. A basic requirement for any sea exploration is a suitable ship; and this

fact dictates the manner in which all the work is done. The economics of oceanographic work have to be related very closely with those of running and maintaining a ship and this, as you may guess, is an extremely expensive business. The ship has to be big enough to be able to cross the largest oceans and to be able to remain at sea for three weeks or so, and to provide laboratory and living facilities for both scientists and crew. Much of the preliminary examination of the results must be carried out on board. The ship must be equipped with at least one deep-sea winch that contains enough wire to lower instruments to the bottom: in fact, most research ships have two or even more.

FIGURE 1. *Royal Research Ship* Discovery II

The Royal Research Ship *Discovery II*, which is now run by the National Institute of Oceanography, is perhaps bigger than most oceanographic research ships. She was built in 1929 for the Discovery Investigations Committee, whose aims were to study the marine biology of the waters of the South Atlantic with reference to the whaling industry. As she was going to spend so much time near the ice edge of Antarctica, her specifications were rather more stringent than those of other research ships that do not have to travel so far or in ice conditions. She has a displacement of some 2,000 tons and carries a crew of about fifty, together with nine scientists. She has six laboratories on board for various aspects of the work—chemical, biological, geophysical, and so forth—and deck equipment that can handle anything that she is required to put over the side. I will not say that we never grumble at the ship, for she can roll as badly as any in rough weather and her speed is quickly reduced with a head wind. But in comparison with other research ships her facilities are excellent.

In planning a cruise of geophysical exploration of the sea floor there are two approaches that can be used, and this choice is forced on us by the fact that we can never rely on the weather to be good. Most of our work has to be carried out

in winds less than strong to gale, and for many purposes calm weather is necessary. We can either decide in advance to study a particular area or feature, steam there and stay around until the weather enables us to carry out our programme; or else we can say that we will steam towards a given area and, whenever a nice day occurs, stop the ship and explore wherever we happen to be. So long as there are large areas about which we know nothing, then we can most usefully employ the second method, but when we know the general picture we want to make more detailed studies and to fill in gaps in the survey, and then we have to hope for the best weather or devise experiments that can be made in bad weather.

The cruise that I am going to describe employed both these approaches, as you will see. The Department of Geodesy and Geophysics at Cambridge and the National Institute of Oceanography planned a joint geophysical cruise for July and August last year under the leadership of Dr. Maurice Hill and Sir Edward Bullard. The cruise, which lasted six weeks, was divided by a stop of three days at San Miguel in the Azores for fuel and provisions, and for the recuperation of the scientists and crew.

Our target for the first half of the cruise was a valley in the mid-Atlantic ridge where we were anxious to make some measurements of the heat flowing through the ocean floor. This valley has been the subject of investigation on previous cruises and it has been suggested that it runs along the whole length of the mid-Atlantic ridge from near Greenland to the south of Africa. The heat that flows out through the earth's crust is related to the amount of radioactivity in the rocks forming it, and it is known that certain rocks, in particular the granites which form a large part of the continental crust, have much higher radioactivity than the basic rocks such as basalt. The heat flow, then, can help us to identify the suboceanic rocks. But although this was one of the principal objects, we also stopped whenever possible to carry out seismic work, to dredge for rocks, to core into the bottom sediments and to carry out the first extensive trials of a new deep-sea underwater camera that we had designed and built at the Institute. Similarly, in the second half of the cruise, in which we went further south, we seized the opportunity provided by the good weather to do as much work as we could where we happened to be, and we in fact concentrated our studies for several days on a small seamount that we discovered.

Throughout the whole cruise while we were steaming we made continuous measurements of both the depth, to give a profile of the ocean bottom, and of the intensity of the earth's magnetic field. We wanted the magnetic field measurements because they are influenced by the presence of rock masses buried beneath the sediment, which otherwise cannot be seen. As these instruments require constant attention, all the scientists on board combined to keep a twenty-four hour watch on them. This is one of the more tedious duties that befall seagoing oceanographers, but it is nevertheless one of the most important, since continuous records, wherever the ship goes, steadily build up an overall picture of the vast areas of the sea bottom.

The depth profile is obtained with an echo-sounder. This is a machine which

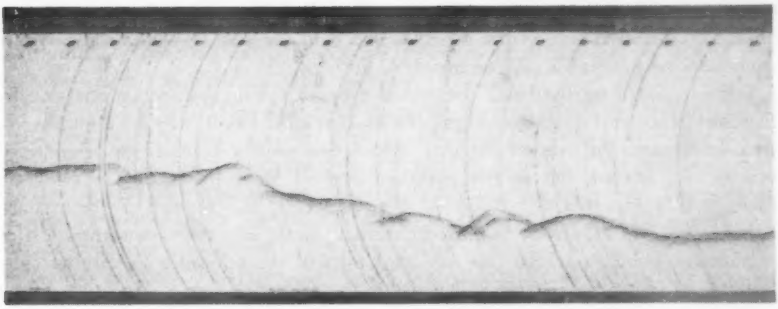


FIGURE 2. *Profile of the sea floor at 1,800 fathoms as recorded by an echo sounder (vertical exaggeration 7:1)*

sends out a short, ultrasonic signal, or 'ping', and listens for the echo. The time delay between the outgoing 'ping' and the echo is a direct measure of the depth and this is automatically recorded on paper by a rotating pen. A 'ping' is sent out every five seconds and so, as the ship moves on, the shape of the bottom is gradually built up on the record. For the sake of convenience and for accuracy of depth measurement, the record is made so that the vertical scale is exaggerated to seven times that of the horizontal scale and all features appear much steeper than they really are. Figure 2 shows a section of the sea bed at a depth of 1,800 fathoms (or nearly two miles) just south of Madeira Island, where the bottom is fairly rough and probably consists of banks of unconsolidated and semi-consolidated sediments. The appearance of the record is often most useful in interpreting the nature of the bottom. For instance, an area where there are a lot of large rocks strewn around gives a much longer echo than an area of uniform sediment, just as in a cave you get reverberations from your voice echoing all around, whereas from a cliff face the echo is sharp and distinct. A hard bottom gives a much stronger echo than a soft bottom, as you would expect.

What have our echo-sounding surveys given us? We have prepared a contoured chart of the ocean bottom of part of the north-eastern Atlantic, based on some 12,000 miles of steaming by *Discovery II* and by ships of the Admiralty Hydrographic Department. We can see that the continents are bordered by a shelf of shallow water, usually less than 100 fathoms in depth, that extends out about 50 miles or so from the coast. Then, going further seaward, the bottom plunges quite steeply to the great oceanic depths of several thousand fathoms. Compared with typical slopes on the land, the continental slope is fairly gentle (for instance, you could quite easily ride a bicycle up the continental slope), but extending for a great many miles. The ocean basin of the eastern Atlantic is bounded on the west side by the mid-Atlantic ridge, which rises to the surface in some places, such as the Azores Islands. On the whole the bottom is fairly flat, comparable perhaps with the Home Counties, but in some places it is exceptionally flat. These exceptionally flat areas are the abyssal plains and extend for many hundreds

of miles with gradients of less than one in a thousand. They are to be found on the continental side of the ocean basins, and the way in which they acquire such extreme flatness is still an unsolved problem.

Superimposed on the basic pattern of a broad basin confined on one side by the continents and on the other by the mid-Atlantic ridge, we find a number of smaller features such as seamounts, which are usually volcanic in origin, and submarine canyons, cut in the continental shelf, or even, in one or two rare cases, cut across the flat floor of the basin. In the region of the eastern Atlantic off the mouth of the Mediterranean there is a great concentration of seamounts, some of which rise out of depths of several miles to within a few fathoms of the surface where it is possible to anchor the ship.

It is in the vicinity of these seamounts that we have taken most of our underwater photographs. But before I show you what we have found I want to describe the camera and what is involved in using it. Photographically, the problem is not difficult, since the water near the bottom is extremely clear and all that is necessary is to place a window between the camera and the water. It is true that the water imposes some limitations on the distance we can see and also affects the focal distances, but the chief problems of design are concerned with

FIGURE 3. *A deep-sea underwater camera*

keeping everything watertight against the high pressures of the deep ocean (up to three tons per square inch), and making the whole unit self-contained and automatic, so that the only control necessary from the ship is that of the wire on which it is lowered.

The camera (Figure 3) consists of three units, each of which is contained in its own pressure-proof case, together with its own batteries. The lowest unit is the light source, which is an electronic flash similar to those used for indoor photography. No daylight penetrates below a few hundred feet from the surface and so the photographs need artificial illumination. For the same reason the camera needs no shutter since it is always dark. The camera is above the light, so that we can see the shadows behind objects in order to judge their height. The spools of the camera hold 15 feet of 35 millimetre film, and this enables us to take up to a hundred pictures in a sequence without raising the camera to the surface. There is a small motor inside to wind the film on to the next frame whenever a picture has been taken. The third unit is the acoustic signalling device or 'pinger' which signals to us on the surface, maybe three miles away, that the camera has reached the bottom.

When we want to do a camera station, then, we first examine the bottom by echo-sounding to find out the depth and to place the ship over the feature we want to look at. Then with the ship stopped, and heading into the wind, we lower the camera over the side on our 4 millimetre hydrographic wire. As it goes down we can hear the regular 'ping' every five seconds on the hydrophones that we have in the water. These regular 'pings' enable us to keep in contact with the camera as the signals get weaker. In deep water it may take half an hour to reach the bottom, and everything must be kept quiet to hear the signals at all. When the camera touches the bottom a fast group of 'pings' is transmitted, and the winch operator stops and reverses the winch as soon as possible. The camera is lifted a few fathoms off the bottom and a minute later is lowered to take another picture. By that time the flashlight has re-charged and a new film is in position. This process is repeated for as long as we can afford, giving us a series of pictures while the ship drifts, and then we bring the camera up. The whole station in deep water may take three hours. We like to develop and print all the pictures on board and use these as the basis for further experiments such as dredging or coring.

In the deep ocean basins the bottom is composed entirely of sediments, a mixture of clay particles and the remains of millions of small creatures—the foraminifera—that live in the surface waters and sink when they die. It is chalky to look at and feel, and is known as globigerina ooze. It is not, however, flat and featureless as we have supposed in the past, but is in fact covered with the burrows and workings of the animals that live on the bottom. Often we find tracks, sometimes with an animal on the end, but more often without. Because of the very small currents and the incredibly slow accumulation of sediment (about a centimetre in a thousand years), these features are preserved for a very long time. In the basins we have never yet seen exposed rocks and we do not really expect them. All we find is mile upon mile of this ooze.

FIGURE 4. *Typical view of the deep ocean basin floor at 2,550 fathoms. The ooze has been disturbed by the burrows and tracks of bottom living fauna. The track* (on the left), *which is 4 inches wide, has probably been made by a holothurian, or 'sea-cucumber'*

Coming up to the foothills of a seamount, we reach areas where there may be sands or gravels interspersed with areas of ooze, sometimes undulating, suggesting a sediment cover following the contours of buried features, sometimes with a few isolated rocks possibly thrown out by a nearby volcano. Here we have found some indications of fairly strong currents that have not previously been expected. Figure 5 shows ripple marks caused by currents on a sandy bottom at a depth of 720 fathoms. Now the fact that we see ripple marks here and not in the deep plain areas does not necessarily imply that the currents are absent in the plains, since they will only leave their mark in places where the bottom material is sandy, and in general we do not find sand on the bottom in the deep basins. But deep-sea photographs were the first evidence we had that there were currents near the bottom in the deep sea, strong enough to make ripple marks.

When we get on to the steep sides of the seamount, which may be as steep as one in two, we find a great variety of scenery. There are large areas of boulders, sometimes several feet across, lying half embedded in sand and ooze, often with the long wire-like sea pens attached to them; sometimes there are pockets of barren sediment, shingle and sand. Then, on the peaks, we find bedrock—the material of which the whole seamount may be made—exposed and swept clear of all accumulating sediment by currents that have scoured and rounded the rock faces. It is very difficult from the photographs to obtain a positive identification of the rocks we see, and so we try to get samples by dredging or

coring in the same place. On one occasion we were saved from an erroneous interpretation of the rocks in a picture by subsequent dredging. The appearance of the loose rocks, which had parallel striations on them, suggested the type of layer formation associated with sedimentary rocks, which would be extremely difficult to explain in this locality. Our dredge samples, however, showed that the striations were not bedding planes, but were caused by layers of bubbles in a rapidly cooling underwater lava flow which had become accentuated by later sediment deposition.

The shallower we got, the more abundant became the life that we saw. Most common were the hydroid or coral type of animals. These are really colonies of thousands of small polyps, similar to small jelly fish, which are attached to central stalks of brittle calcareous material. This group includes the very decorative sea fans and sea ferns, the long sea pens and the corals and the great variety of sea anemones. The sponge family is also found very frequently in our pictures. The commonest is a small, round sponge, rather like a puff ball, which is usually seen on muddy bottoms. But in one area we found some huge, vase-shaped sponges, up to three feet in diameter. This is not the soft, horny type of sponge

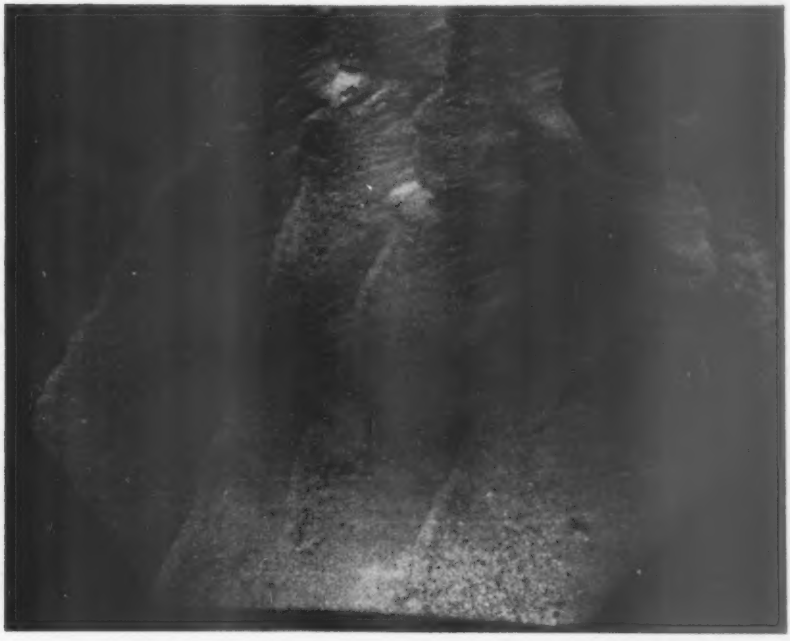


FIGURE 5. *Ripple marks on a sandy bottom at a depth of 720 fathoms. The distance between crests is about one foot. They are caused by currents moving from left to right*

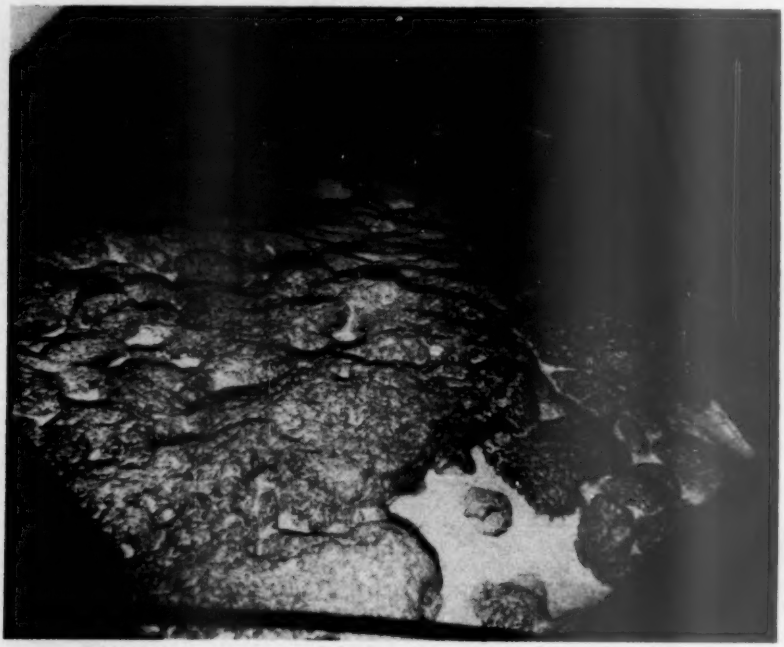


FIGURE 6. *A panoramic view of exposed bedrock on the side of a seamount at a depth of 720 fathoms. The bareness of the rock suggests currents. The width of the picture in the foreground is about 5 feet*

used in the bath, but is brittle and spiky, being made largely of silica. We are occasionally lucky in photographing a fish, but the fish is not always obliging enough to be in the centre of the picture, and often we see just the tail or perhaps only its shadow. We are then tempted to revert to the angler's practice and speculate on the size of the one that got away. The identification of fish is extremely difficult, especially the larger ones which are rarely caught by nets, since they swim too fast. It is quite likely therefore that some of the fish we photograph have never been seen before, and it is necessary to extend the classification to include them.

Underwater photography is an extremely useful and simple method of exploring the sea bottom, and an extensive collection of photographs from representative areas will outline the field for more detailed studies. In itself, it cannot go very far, but in collaboration with sampling, both with dredge and trawl, we may find out a lot more about the deep-sea environment.

I have discussed two of the techniques that we use for exploring the deep ocean floor, echo-sounding and photography, but there are many others equally

important that I have not time to describe in detail. A great deal of work has gone into the design and use of apparatus for obtaining samples of the ocean floor. The simplest method, and one which can be used with any type of bottom, muddy or rocky, is dredging behind a very slowly moving ship. When you remember that the dredge may be two miles down and as many, or more, miles astern, you can appreciate that a great deal of wire is necessary, and that the tension at the inboard end is very great. It is often difficult to know whether in fact the dredge is on the bottom or streaming astern. In soft sediments we gain more information by sampling the different layers in a vertical column, which is done by driving in a tube and retaining the sample trapped inside. Cores of up to a hundred feet have been obtained in this way, representing sedimentation during the past few million years. Study of these cores can tell us about climatological changes during this period which affect the species of foraminifora composing the sediments, and about the geological history of the area.

I have already mentioned the seismic methods that form a large part of our exploration. Measurements of magnetic field, gravitational field and heat flow all contribute to our knowledge of the sea floor structure. I have not made any

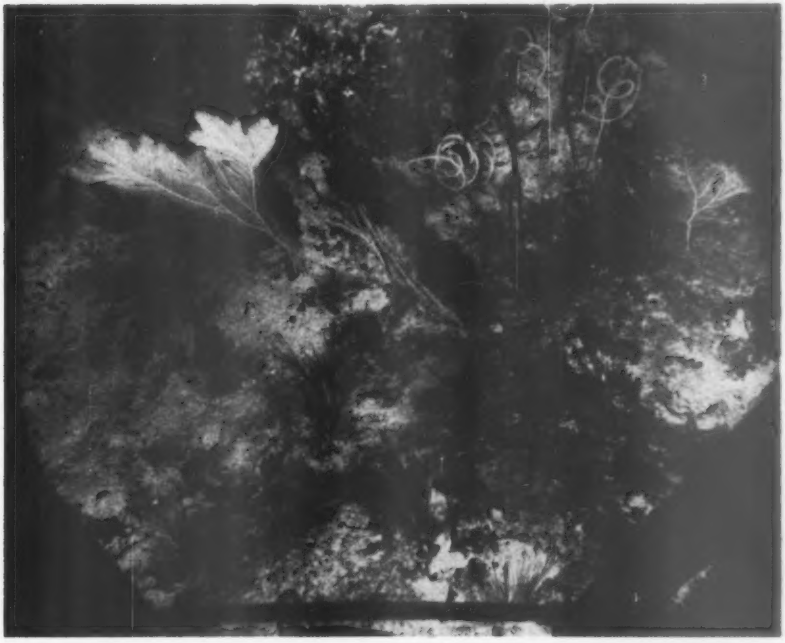


FIGURE 7. *Profuse growth of corals, sea fans and sea pens at the top of a seamount in 73 fathoms. Weak daylight can penetrate to this depth*

FIGURE 8. *Giant sponge, 3 feet in diameter, one of many in the area, at 238 fathoms on Ampere Bank*

mention so far of a method of exploration that is still in its infancy. This is by personal descent in a bathyscaphe, a pressurized submarine capable of descending two or more miles into the ocean abysses. There are two bathyscaphes in operation in Europe; the *Trieste*, which was described to you two years ago by M. Jacques Piccard, is operated in Italy, and the other, F.N.R.S. 3, is run by the French Navy. There is no doubt that in the future the bathyscaphe will become a powerful tool of deep-sea exploration, but it is still an expensive and somewhat limited machine and its potential has not yet been fully developed.

You will have gathered, I hope, that the field for exploration of the deep-sea floor is extremely large, and what I have described is a minute portion of it. More and more countries are turning their eyes seawards in search of new sources of food and minerals, and the interest in oceanography is growing. But the inherent difficulties of seagoing exploration do not permit the work to be done quickly, and it will be many years before we can travel in imagination across the floor of the great oceans, and make use of nature's reserves protected by three miles of water.

ACKNOWLEDGMENT: *Figures* 5, 6, 7, 8 *and* 9 *are reproduced by kind permission of the Lamont Geological Observatory, New York.*

FIGURE 9. *A large fish at 250 fathoms on a seamount on the mid-Atlantic ridge. The fish, which is probably 10 feet long, has not been identified*

DISCUSSION

THE CHAIRMAN: I thought that with the capture of Mount Everest we had virtually completed the exploration of this little world of ours, and that this effort to explore outer space which we have been hearing about lately was the result of having finished at home! But it is quite obvious from what we have heard this afternoon that there is still quite a lot of exploration to do right at our front door. I have listened with great interest to what Dr. Laughton has said, and it is quite obvious that his camera is something of which he may well be proud.

I should like to ask him a very simple question: on a voyage such as he spoke of to this mid-Atlantic ridge valley, how many photographs did he take? Also, what was the average time for taking a photograph?

THE LECTURER: On that cruise we took, in all, two hundred photographs of the sea floor. Inevitably I have picked out the most interesting to show; there are a great number which are extremely dull—of flat, muddy bottoms. It is perhaps not quite a fair selection that I have shown: if I emphasize that a great number of them are dull it might give you some idea of what the bottom is like.

An underwater camera station may take two or three hours at ordinary depths, and that may yield something like twenty or thirty photographs. Generally we do not go on for much longer.

DR. J. L. CLOUDSLEY-THOMPSON, M.A., PH.D., F.L.S.: It is thought that certain species of sponges (Hexactinelleda) are deformed in the presence of currents. Is it possible

to know which way the camera is pointing, and thereby determine the direction of these deep water currents from the orientation of the hexactinellid sponges?

THE LECTURER: There are two problems here: first, orienting the camera, and secondly, knowing what the currents in fact are. As far as orienting the camera is concerned, that we propose to do; it is a matter of adding a recording compass to the camera. The other problem, of measuring the currents on the floor of the ocean, is much more difficult. We have done it at one or two particular places: we did it this spring underneath the Gulf Stream by suspending a ping-pong ball on a piece of string and photographing it from above, and the deflection of the ping-pong ball and the direction of the deflection gave a measure of the current. This, by the way, showed a strong south-going current underneath the north-going Gulf Stream. We can in principle combine these two measurements and discover the orientation of the sponges with respect to the currents.

MR. R. SPEARMAN, B.SC.: Do you find underwater television of value in such work?

THE LECTURER: We have not used underwater television to any extent; we did have it on *Discovery II* for a brief period while the Admiralty Research Laboratories were experimenting with their set. At the moment, however, it can only operate at a limited depth. The Pye Company makes an underwater television set which can operate down to 3,000 feet (500 fathoms), but this is not much use for our deep water work. The limitations are in the cable from which the camera is suspended, both in respect of length of cable and sending the signal up it, and from the point of view of the strength of the cable for carrying its own weight. It is an extremely difficult thing to hang a cable vertically if it is more than two or three miles long, because the strain at the top is usually as great as the breaking strength of the cable. But underwater television has served very usefully in shallow water.

BRIGADIER J. L. P. MACNAIR: The Lecturer cast doubts on one element of Aristotle's, namely the presence of fire as an element in the earth, and he said that fire played a very small part in it. I am not sure that that is strictly true if you accept the normal theories of the interior of the earth. The evidence of fire, of course, is based largely on the necessity for the presence of oxygen in the air, which results in the evolution of gas. But there are two other agencies which can be accepted as being fire in the Aristotelian sense, namely, the evolution of both heat and light. If the interior of the earth is molten, or at any rate contains an excessive amount of heat, which it probably does—evidenced in places like Rotorua in New Zealand, where you can step on hot ground—I should imagine that in the depths of the ocean there must be patches where the earth's crust is so thin that there is considerable local evolution of heat. I should like to ask the Lecturer if he has found—presumably one of the investigations he does undertake is that into differences of temperature in the water—patches in the depths of the sea where the temperature really rises? One would expect that under the sea in special conditions you get such a thin crust that the water would actually be boiling, at any rate for a certain distance until it had dissipated its heat. Has the Lecturer found anything of that sort?

THE LECTURER: The answer to that is in two sections. I think the Aristotelian meaning of fire is probably not very well defined. I concede that the interior of the earth is probably very hot, although modern theory suggests that it is, in fact, not nearly as hot as people used to think. There are two theories to account for the origin of the world: one assumes that it started as a mass of hot gases which gradually condensed into a liquid which formed a solid crust on the outside; the other theory postulates a great quantity of cold dust which became attracted together, and supposes that the gravitational compaction has raised the temperature inside until the inside

has become liquified. But on either theory I think we must concede that it is hot inside. It is not, however, quite as hot as would be suggested by the heat of volcanoes, because a large amount of the heat from volcanoes is derived from the actual chemical combustion of gases as they come into contact with the atmosphere, and that raises the temperature of the mouth of the volcano considerably above the temperature down below.

The temperature of the water at the bottom of the ocean is nearly always within a few degrees of freezing point, and it is controlled very largely by the inflow of water melting from the Antarctic and the Arctic, which is colder and heavier than the rest of the water and flows along the bottom of the ocean floor. We can even track the Antarctic water up north of the Equator.

There is no evidence, as far as I know, of excessive temperatures being found near the bottom, except on one or two rare occasions when a volcano erupts under the sea, as recently happened near the Azores. The earth's crust is still appreciably thick under the ocean, even if it is thinner than under the continents; it is something of the order of 5 kilometres thick under the oceans.

MR. P. RUSSELL, B.SC.: I should like to ask the Lecturer what type of films he used and what was the order of exposure necessary and the candle power of his flash lamp?

THE LECTURER: I used standard 35 mm. film, mostly HP3. The exposure was determined entirely by the flash, there being no shutter on the camera: the lamp has a 100-joule flash and the aperture of the lens was usually of the order of f./6.3 or f./8. It could go up to f./3.5, but we did not use an aperture of that size except for the colour photographs, where we need to use all the light that we can.

MR. MICHAEL DICK, B.SC.: I was very interested in the photographs of the sea bottom. Is it a fact that the weight does not touch the bottom or is the bottom so firm as not to create any disturbance and dust? I was interested in the character of the photographs.

THE LECTURER: The weight does in fact touch the bottom, because in order to trigger the camera the mass of the weight must be supported by the bottom. This does produce a cloud in the water, but as the camera is looking obliquely and is some 10 feet above the weight the cloud has not got time to reach the field of view before the picture is taken. Sometimes when things are not working very well, and there is a delay before the picture is taken, we see a big cloud. That, in time, diffuses out into the water.

MR. R. U. TAIT, B.SC.: The Lecturer spoke of the speed of currents he had found which were fairly fast: I wonder if he could give us some indication of what that is in terms of knots per hour? I should also like to ask how accurate these soundings are? Also, the Lecturer spoke about recent disturbances on the bottom—and at another time he mentioned the extraordinarily slow rate of sedimentation—in what terms were these 'recent disturbances'?

THE LECTURER: The speed of the currents necessary to produce ripple marks on the bottom depends on a number of different factors, including the grain size of the sand. A very rough figure is half to one knot—but this may be in error by a factor of four. The current measured beneath the Gulf Stream was 10 cm./sec., or 0.2 knots.

In taking soundings we like to be accurate within about 2 or 3 fathoms in 3,000, that is 0.1 per cent, and this is governed by the accuracy of the speed with which the echo-sounding pen rotates. We check this every time we take a sounding, each quarter of an hour. The sounding we obtain is essentially a time measurement, and to convert it into a depth measurement we have to know the velocity of sound in water,

which varies from place to place in the ocean. For this conversion we use some tables which were prepared by the Hydrographic Office just before the war.

By 'recent' disturbances on the mid-Atlantic ridge, I mean disturbances that have occurred during the last 500 years judged from the lack of accumulated sediment on the rocks. The sedimentation rate in normal calcareous deep-sea sediments is about 1 cm. in 1,000 years, but this is reduced to 1 mm. in 1,000 years where red clay is being deposited.

THE CHAIRMAN: I should like to ask a supplementary on the question of echo sounding. Is there any diminution of the velocity of sound the deeper you go down, due to the density of the water?

THE LECTURER: The velocity of sound depends on three things in the water: the temperature, the salinity and the density; and these various factors interplay. The temperature of the sea decreases steadily as you go down from the surface, producing a decrease in velocity, whereas the pressure increases as you go down from the surface, producing an increase in velocity. The result of these two is that there is a minimum velocity at a certain depth, at about 600 fathoms, above which the velocity is higher and below which the velocity is higher.

THE CHAIRMAN: So that you do not know what the variable for density is until you have got the depth?

THE LECTURER: The starting point for this is water-sampling: you actually take samples of the water and you measure the temperature *in situ* with deep-sea thermometers, as has been done all over the oceans in the world. This gives the fundamental data of classical oceanography, measurement of temperature, salinity and pressure.

MR. G. B. POYNTER, B.SC.: Could Dr. Laughton say whether or not samples of mud are being examined with respect to bacterial fauna?

THE LECTURER: Our own samples are not, as far as I know; the only work I know of in this field is going on at The Scripps Institution of Oceanography in California with Dr. ZoBell. The samples which we have taken so far we have only studied from the mineralogical and the geological points of view.

THE CHAIRMAN: Ladies and Gentlemen, I am sure you would want me on your behalf to thank Dr. Laughton for an absorbing lecture. If my opening remark was as to his youth, I am sure the ability he has shown amply justifies us in asking him to lecture to us this afternoon. I think, too, that the way he has answered our questions, showing such a quick grasp of his subject, is an indication of the extent of his interest in his work and of the knowledge that he has acquired. It has been an excellent paper, admirably illustrated, and I am sure you would wish to give him a very warm and hearty vote of thanks.

The vote of thanks to the Lecturer was carried with acclamation and the meeting then ended.

GENERAL NOTES

NOTABLE COLLECTIONS IN LONDON AND MANCHESTER

It seems fitting that, in this first issue of the enlarged monthly *Journal*, one should turn away for a change from the private London galleries to survey those collections of larger significance which have a bearing on the work of this Society, or on those who have guided it. The exhibition of European old masters at the City of Manchester Art Gallery, for example, reminds one that it was the Prince Consort who opened its historic predecessor in Manchester in 1857, a centenary now so admirably commemorated in the gallery's long range of rooms upstairs. At the same time, among the present activities at the Victoria and Albert Museum, it is good to find there the twenty-fifth exhibition of the Arts and Crafts Exhibition Society, and to observe, among so much that is interesting, examples of the most refined work of our scribes and illuminators graciously loaned by Her Majesty The Queen, as well as by our Royal President.

But the Victoria and Albert has also been attracting visitors for other reasons. The pair of magnificent hunting tapestries (from the set of four), previously owned by the Dukes of Devonshire, have now departed from the New Acquisitions Court to which they gave a medieval splendour, though it is intended that all four shall be hung together in the Museum in perhaps a year's time after further restoration work. Of the two tapestries lately exhibited, the *Roe Deer Hunt* was seen to be scrupulously cleaned, and to support the view that this elaborate assemblage of incidents, full of entertaining and curious details, was completed not later than 1450. To this period also, no doubt, belongs the *Falconry* piece, another rare product of the looms of Tournai, which one looks forward to seeing again when the delicate pinks, green, and blue on a cream ground have been cleansed of the grime of decades. Meanwhile, there is evidence to indicate that these tapestries were associated with the marriage of Henry VI with Margaret of Anjou, and to fortify the opinion that they only passed into the possession of the Cavendish family sometime in the late Middle Ages, to survive as a rare example of medieval tapestry with lay subjects.

Another event of importance to the Museum has been its recent opening of new galleries of paintings, constructed within a court at the back. Here space has happily been found for many of those pictures, including the celebrated Constable collection, which were displaced when the Victoria and Albert took over the Indian works from the old Indian Section's building, since demolished. From the new Constable Gallery—where you notice the *Dedham Mill* restored to its pristine brilliance after cleaning—one progresses past the early English water-colourists to the varied Ionides Collection with its stress on the Barbizon school, and so at length to the British oil paintings of the eighteenth and nineteenth centuries.

It is an absorbing progression, and it is tempting indeed to consider a number of Victorian paintings on view for the first time since cleaning. But away in room 45, and in the spacious vaulted chamber adjoining it, the Arts and Crafts exhibitors invite us to judge contemporary standards of workmanship in an assemblage of over eight hundred items. Here, the first and lasting impression is of the skill with which these modern exhibits have been displayed to advantage in ornamental Victorian galleries not at all adapted to the purpose. These walls are now camouflaged by white silken hangings in which 'shop windows' have been inserted to display embroidered pictures, tapestry, and other glowing decorations. In roped-off enclosures in the centre of the immense floor space, the clean shapes of furniture, ceramics, and silverware produce an effect of spareness without severity, while at the end of the main gallery the eye is refreshed by cascades of multi-coloured textiles.

One of the chief impressions gained from this assemblage is of the ingenuity, and

not infrequently the surprising beauty, of fantastic designs embroidered in wool and cotton on canvas, exhibiting a luxury of colour and texture unmatched in any other medium. No doubt these artifacts are generally appraised less highly, shall one say, than the products of the artist-potter. But it is a fact that the ceramic pieces here—mostly traditional in form and decorated, if at all, with the customary Japonesque brush-strokes—show considerably less inventiveness than the embroideries, which deserve to be more highly rated. On the other hand, the exquisite work now being done by professional scribes and illuminators has come to be recognized as a notable revival; and here, Miss Margaret Alexander's penmanship in a Loyal Address to Her Majesty The Queen, and the more elaborate vellum decorations of Heather Child, Dorothy Hutton, and Marie Angel, in particular, raise a delicate craft to the rank of a fine art. Indeed, this varied exhibition is no less valuable to craftsmen for enabling them to make critical comparisons, than it is in allowing them to show their latest work publicly, a point made in Sir Gordon Russell's introductory note.

And now, what can be said in a little space of Manchester's enterprise? The city's Art Treasures Exhibition in 1857 was, of course, an historic event, comparable to the Crystal Palace Exhibition of '51. Indeed, Manchester repaired London's omission by assembling over 2,000 works to illustrate the development of European painting, among the 16,000 various objects of art borrowed from private collections throughout the kingdom, and housed in temporary structures. Queen Victoria attended and, within six months, 1,300,000 of her subjects.

That immense collection is scattered widely now, many exhibits abroad and beyond retrieving. Nevertheless, the Manchester Art Gallery enterprisingly observes the centenary with some 250 European paintings extending from the Italian Quattrocento to the nineteenth-century British school. These preserve in some sort the identity of the 1857 collection, with lesser known additions. Though inevitably there are important gaps, it remains an absorbing array with a proper emphasis on the great Venetians and the seventeenth century, which characterized the original exhibition. Titian's portrait of a bearded man shines out after cleaning, while Tintoretto's turbulent *Esther before Ahasuerus* is among the masterpieces whose eloquence so largely relies on a rhythmic play of hands. In the last room hang the same paintings by Landseer and Frith, Eastlake and Madox Brown, as delighted the complacent, top-hatted visitors a hundred years ago.

NEVILE WALLIS

COUNCIL OF INDUSTRIAL DESIGN ANNUAL REPORT, 1956–57

The mounting public interest in The Design Centre, which was noted in the last issue of the *Journal*, is a sign of progress fully recognized, yet soberly measured, by the Council of Industrial Design in their Twelfth Annual Report. The large attendance of trade visitors from overseas; the readiness of manufacturers to submit, and pay for exhibits; the number and range of items shown, together with the extensive publicity the whole venture has received—all these developments strongly support the conclusion expressed that 'The Design Centre is the most useful tool that the Council has devised for . . . promoting the improvement of design in the products of British Industry'.

It can only be a matter for congratulation that so much has already been achieved. But the Report goes on to emphasize that this success is still only very partial when compared with the total population, and that the manufacturers included in the exhibition represent only a fraction of the industries concerned. The task that lies ahead is not only one of attracting large numbers of people (who must come to London), but of reaching them also: of ensuring that the policy and ideas behind the exhibition are disseminated as widely as possible. In this respect it is good to learn from this Report that *Design* magazine extended its readership steadily in the year

under review, and that as a result of visits by the Council's industrial officers to individual firms there has been a greatly increased demand from manufacturers for the services of staff or consultant designers. Another notable activity—though one with a less easily identifiable result—has been the arrangement of courses and lectures on industrial design for the public in various parts of the county. And the establishment of the Scottish Committee of the Council of Industrial Design in new and improved premises in the centre of Glasgow has proved of benefit to them in their work, both in that city and in Scotland at large.

Copies of the Report, price 1*s.* 6*d.* each, may be obtained from the Council of Industrial Design at 28, Haymarket, London, W.1, or from Her Majesty's Stationery Office.

PRESERVATION OF ARCHITECTURAL RECORDS

In view of the rapid disappearance of examples of the smaller domestic architecture in this country, the Vernacular Architecture Group is making efforts to preserve existing graphic records, such as plans, elevations, sketches, sections and photographs, and to make copies available for study. All architects whose practice includes, or has included, work on old buildings of any type, and who are willing to give or lend the relevant records, are invited to communicate either with the Director, The National Buildings Record, 31 Chester Terrace, Regent's Park, London, W.1, or with the Honorary Secretary, The Vernacular Architecture Group, 8 Water End, Clifton, York, stating if possible the scope of the material in their possession.

OBITUARY

MR. F. H. ANDREWS

Mr. Fred Henry Andrews, whose death was briefly reported in the last issue of the *Journal*, will be long remembered both for his services to oriental art and archæology, and as the close associate of Sir Aurel Stein, the explorer.

An elder brother of George Arliss, the celebrated actor (whom he persuaded, in 1937, to give a memorable lecture to the Society on 'The Stage and the Screen'), Fred Andrews was born in London in 1866, the son of Arliss Andrews, an enterprising printer and publisher. It was in the atmosphere of the family business that he received much of his early education, but when his artistic inclinations became clear he was sent for training in the studio of an artist in stained glass, and also attended the St. Martin's School of Art. He took the diploma of art master in 1887.

In 1890 he was appointed Vice-Principal of the Mayo School of Art in Lahore under Lockwood Kipling, whose son Rudyard he already knew, and whom he shortly succeeded as Principal of the School and Curator of the Lahore Museum. From this time dates his friendship with Aurel Stein, which was to prove so happy for both men: for it was as a result of Andrews' influence that Stein adopted oriental archæology and exploration as his main interests; whilst in caring for, and presenting, the results of Stein's expeditions and discoveries, Andrews found an occupation in which he both delighted and excelled.

He held a number of important teaching and administrative appointments after leaving Lahore. From 1898 he was Head of the Art Department of the People's Palace, Whitechapel, and from 1906 head of the Art School of the Battersea Polytechnic. In 1913 he went to Kashmir to become Principal of a technical institute at Srinagar, a post which he resigned in 1920 in order to devote himself to work on the wall paintings from Central Asia which had been collected in New Delhi. The spirit which he put into his collaboration with Stein from the very beginning survived the latter's death in 1943, and it was only in the last ten years of his own life

that Andrews completed his self-imposed tasks. His patient scholarship and scrupulous regard for detail and accuracy in describing the objects found by Stein were of great value in clarifying the picture of ancient Asian civilization which emerged; and the quality of his judgment is seen to particular advantage in the catalogues which he compiled for the Government of India.

Mr. Andrews was made O.B.E. in 1924 and returned to England some years later. In 1935 he became a Member of Council of the Society, on which, except for two breaks of one year each, he served until 1956. During these years he played a notable part in the government and proceedings of the Society, his clear and decided views always being expressed with a courteous but pithy forcefulness which could not be lightly gainsaid. He took an especially active share in shaping the Society's many-sided work in the promotion of industrial design, and his membership of the Committee which advised the Council on the institution of the R.D.I. distinction deserves special acknowledgement in this connection.

Many Fellows will remember him at meetings of the India and Burma Section, before which he lectured twice: in May, 1942, he read a paper on 'Art in India and External Influences' (*Journal*, 16th October, 1942, p. 709), and in March, 1945, at a joint meeting with the East India Association, he advocated the establishment of 'An Oriental Cultural Centre in London' (*Journal*, 25th May, 1945, p. 324). He also contributed a number of reviews of books and exhibitions to the *Journal*. An enduring testimonial to his taste and skill is the present emblem of the Society, which is based on his original design.

Mr. Andrews was elected an Honorary Life Fellow of the Society in 1948. In 1956 his daughter, Mrs. N. W. Michael, willed to the Society the sum of £1,000, desiring that it should be known as the 'Fred Henry Andrews Bequest', and that the income it produced should be used for the purchase of books for the Library, in which, as a member of the appropriate Committee, her father always showed such a discerning interest, and for which he devised a handsome book-plate.

Sir Frank Brown has contributed the following personal tribute:

It was my custom now and again to visit Fred Andrews in his flat on Sydenham Hill, where he greatly prized the delightful view of the wooded lower slopes of the hill and the rural prospect over Dulwich Village. After the death of his wife some years ago, he seemed quite content to live alone with the help of a working woman going to the flat on two or three mornings a week. Even when he had lady visitors he refused to allow them to assist in the preparation of afternoon tea or any other form of refreshment. He had acquired by gift or purchase many beautiful fabrics and other examples of Asian handicrafts. He showed these with loving care to his friends. These treasures had each undergone very close scrutiny, and he never wavered in the conclusions he had reached regarding their provenance. When shown in other homes any oriental work of artistic value he was never content with a hasty judgment thereon, and in the end always came to a definite conclusion.

My membership of the R.S.A. Council covered a period almost contemporaneous with that of Fred Andrews. He took a seat near to and almost facing the Chairman of Council, and with his right hand to his ear closely followed the proceedings, intervening in them only on rare occasions, but frequently after the meetings his advice was sought on some question in which he was interested. It should be recalled that the emblem of the Society which some years ago replaced the existing one, was designed by him. Andrews loved to talk of the old days of his close friendship both with Lockwood Kipling, whom he succeeded in the Curatorship of the Lahore Museum, and his famous son Rudyard. The care Andrews took in planning and collating the photographic and other records of the findings of Sir Aurel Stein in innermost Asia was shown by his refusal ever to touch up or otherwise make good any blank, however small or great, in the coloured reproductions of fabrics in the

folio *Wall Paintings from Ancient Shrines in Central Asia*, published in 1949. There can be no doubt that with a mind and memory so well stored, Fred Andrews was a happy man in his last years of solitude as he had been in his fully occupied life up to mid-octogenarian years.

NOTES ON BOOKS

DECORATIVE WROUGHT IRONWORK IN GREAT BRITAIN. *By Raymond Lister. London, Bell, 1957. 35s net*

Iron has always symbolized strength, but it is really quite perishable and suffers from dampness more than wood, accounting for the fact that so much early wrought ironwork has vanished. A close-up photograph showing the irretrievable damage done by rust to Robert Bakewell's masterpiece, the magnificent wrought iron garden arbour (1708–11) at Melbourne Hall, Derbyshire, is reproduced in Mr. Raymond Lister's book as a dire warning against the neglect of these treasures. Mr. Lister tells his story comprehensively and accurately, with the skill of a writer obviously a practical master of the blacksmith's craft. In its purest form wrought iron consists of 98 per cent true iron. The ancient Britons looked upon it as a precious metal and under the Romans they operated a flourishing industry. In medieval days the blacksmith was undoubtedly the most important craftsman in Britain, his iron not only a source of strength and resistance, but also capable of being shaped into objects of ornament.

The technique of smithing, the tools and equipment required, the operations and the types of iron available to-day are vividly described by Mr. Lister. To anyone thinking of engaging in blacksmithing as a hobby—and it is astonishing how many people do become interested in this craft—Mr. Lister's instructions are invaluable, covering as they do all the processes from the different 'heats' to cleaning off and decoration. It is emphasized that years of experience are necessary to become a highly skilled blacksmith, but the amateur is here guided, step by step, in the making of a simple cage-handled poker, a weather vane and an inn-sign with its bracket. Reference is made to the technical schools in large towns where blacksmithing may be studied.

A few prices are given in the short chapters devoted to the social history of the blacksmith. The Cistercian monks at Furness in the thirteenth century earned annual profits of about £6 10*s* from their forges—nearly double the revenue made on their cattle and sheep. A blacksmith in the seventeenth century was paid 4*s* for a six-day week of 72 hours: to-day a good smith commands a wage of 4*s* an hour.

The fine ornamental wrought ironwork remaining in England is discussed in the excellently illustrated Chapter 3. This well-documented story starts with the hinges and strapwork on church doors, these having survived because gilding and painting for many centuries protected them from rust and because, owing to their function, they could not be removed and sold to the peregrinating gentlemen collectors of church treasures in the late eighteenth century.

The richly ornate chantry gates and screen in St. George's Chapel, Windsor, are among the achievements of early English blacksmiths, being designed and made by Master John Tresilian, who was described in the Windsor accounts of 1479 as 'the chief smith'. Those who have visited St. George's Chapel will have marvelled at the impressiveness of this work, originally gilded all over, now iron-grey. It measures 11 feet 6 inches wide and 9 feet high, the whole structure 'minutely chiselled, filed, and dovetailed together like a vast and elaborate three-dimensional jig-saw puzzle, one's mind reels at the immensity of the smith's labours'. Mr. Lister compares these English-made gates with Fabergé productions and rightly comments that 'we need not go beyond the heart of England to see work of even greater detail and complexity,

hewn out of iron with a delicacy, an accuracy that even the precision engineer of the mid-twentieth century with all the finest machine tools at his disposal could not hope to surpass'. Two centuries passed before English blacksmiths again revealed their supreme mastery over iron, but even this was inspired by the Huguenot refugee, Jean Tijou.

Chapter 4 is invaluable to the collector of domestic ironwork, and careful reading of this in association with the whole book should enable modern reproductions to be detected at a glance. Domestic ironwork was made by the humbler blacksmiths, the men who worked in every town and village and on every farmstead throughout the land, forging household articles of all kinds, from elaborate chimney cranes for the hearth to a single hasp.

Finally there is a 15-page glossary full of factual interest. Here we learn, for instance, that 'thunder and lightning' is the smith's colloquial name for a pattern used in fences and gates, with alternate waves and straight verticals, and that 'vizzying' is the old English word for a door grille, known also as a Judas.

G. BERNARD HUGHES

FROM THE JOURNAL OF 1857

VOLUME VI. 20*th November*, 1857

ENVELOPES AND RED TAPE

[*An equal duty was levied on all paper regardless of the purpose to which the paper was put, or the amount wasted in subsequent manufacture. An envelope maker in Blackfriars petitioned the Treasury for a* '*drawback*' (*i.e., repayment of duty*) *on the waste cut from his envelopes. By persistence he gained his point, but the Treasury were not going to make things easy.*]

GENERAL ORDER

Inland Revenue Office,
Somerset House, London,
28th October, 1857

In pursuance of directions from the Lords Commissioners of Her Majesty's Treasury, dated the 13th inst.,
Ordered,—

That drawback of the duty, charged on the waste cuttings of paper made into envelopes, be allowed under the following regulations, viz:—

The paper from which the envelopes were made, must not have been previously used or prepared for any other purpose.

On notice in writing being given by the envelope-maker to the proper officer, the latter must attend at the premises of the former, and examine the cuttings (observing that they are really those from envelopes, which may be known by their curved and angular form) and see them packed in bags and weighed. He must enter the particulars in a Scheme in his Beer Book, showing the gross weight and the tare of each bag, and the net weight entitled to drawback.

The cuttings must be sent to a paper-mill where paper is *not* cut into forms for envelopes, and must be there reduced to pulp or otherwise destroyed; and the officer must forward to the officer at such mill, an advice letter containing an account of the gross weight, the tare, and the net weight of each bag.

On the arrival of the cuttings at the mill, the paper-maker must give the officer thereof forty-eight hours' notice in writing, in order that he may attend to weigh and examine the cuttings; and, if they agree with the letter of advice, he must see them put into a beating engine, boiler, or other vessel, and saturated with water, and thereupon grant a certificate *in duplicate* that the cuttings have been received,

which certificates must be countersigned by his supervisor, who will forward one of them to the officer of the station, and the other to the collector of the collection, from which the cuttings were sent.

On such certificate being received by the officer, he must compare it with the particulars entered in his book, and deliver it to the envelope-maker, who, on producing it to the collector and making declaration before him in the prescribed form, will be paid the amount of the drawback.

Forms of the certificate and declaration may be had on application to the storekeeper.

Supervisors must embrace every opportunity of weighing envelope-cuttings before and after their removal.

If any envelope-maker shall infringe these regulations, to the prejudice of the revenue, this indulgence will be withdrawn from him.

STANDING COMMITTEES, 1957-58

Ex officio members are indicated thus (*)

Distinctions after a name which appears more than once are not repeated

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City and Guilds of London Institute (Technical Authorship Committee): A. R. N. Roberts

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Architects' Registration Council Board of Architectural Education: O. P. Milne

Council for the Preservation of Rural England: A. R. N. Roberts

Chadwick Trust (Trustees): E. M. Rich

London Society (Council): Professor Sir Albert Richardson, K.C.V.O., PP.R.A.

Soane Museum (Trustees): Professor Sir Albert Richardson

Thomas à Becket Cottages, West Tarring (Committee of Management): Oliver Law, F.R.I.B.A.

National Film Library of the British Film Institute (Management Committee): E. W. M. Heddle, M.C., M.A., B.Sc.

Henry Edward Armstrong Trustee: E. M. Rich

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Associated Examining Board of the General Certificate of Education: Dr. R. W. Holland, and the Examinations Officer

National Book League (National Council): The Master (for the time being) of the Faculty of R.D.I.

Some Activities of Other Societies and Organizations

MEETINGS

SAT. 30 NOV. **African Society, Royal,** at Royal Society of Arts, W.C.2. 10 a.m.–4 p.m. Conference : *Africa.*

MON. 2 DEC. **Geographical Society, Royal,** 1 Kensington Gore, S.W.7. 8.30 p.m. D. C. Martin : *International Geophysical Year.*

Imperial Institute, S.W.7. 5.45 p.m. Sir James Shelley : *Arts and crafts of New Zealand.*

TUES. 3 DEC. **Chemical Engineers, Institution of,** at Burlington House, W.1. 5.30 p.m. M. J. Gattiker : *Shell gasification process and its application to industry.*

WED. 4 DEC. **Archaeological Institute, Royal,** at Society of Antiquaries, Burlington House, W.1. 5 p.m. John Summerson : *The Elizabethan fortifications of the town of Berwick-upon-Tweed.*

Manchester Metallurgical Society, at Central Library, Manchester, 6.30 p.m. J. Nutting : *The metallurgical applications of high resolution electron microscopy.*

Petroleum, Institute of, at 61 New Cavendish Street, W.1. 5.30 p.m. D. Downs : *Recent engine developments in relation to fuels and lubricants.*

THURS. 5 DEC. **Chadwick Trust,** at St. Mary's Hospital, Norfolk Place, W.2. Malcolm Morris Memorial Lecture. Ambrose King : *These dying diseases—venereology in decline?*

Chemical Society, at 24 George Street, Edinburgh. 7.30 p.m. Dr. D. S. Davies : *Physical chemistry in the dyestuffs industry.*

At Marischal College, Aberdeen. 7.45 p.m. Dr. R. A. E. Galley : *Problems and prospects.*

Modular Society, at Royal Society of Arts, W.C.2. 7.30 p.m. John F. Hard : *Modular furniture.*

Naval Architects, Institution of, 10 Upper Belgrave Street, S.W.1. 4.45 p.m. By the late R. W. L. Gawn (to be read by R. N. Newton) : *Aspects of propellers for the Royal Navy.*

Photographic Society, Royal, 16 Princes Gate, S.W.7. 7 p.m. R. McV. Weston : *Photomicrography for the medical photographer.*

Refrigeration, Institute of, at Pepys House, 14 Rochester Row, S.W.1. 5.30 p.m. G. C. Eddie : *The development of a quick-freezing plant for distant-water trawlers.*

MON. 9 DEC. **Imperial Institute,** S.W.7. 5.45 p.m. Beryl Miles : *Aboriginal paintings of the Australian Outback.*

Transport, Institute of, at 66, Portland Place, W.1. 5.45 p.m. Major-General G.N. Russell : *Transport and the common weal.*

TUES. 10 DEC. **Architects, Royal Institute of British,** 66 Portland Place, W.1. 6 p.m. Sir John Cockcroft : *Architectural and building requirements as related to atomic energy.*

Metals, Institute of, at University College, Singleton Park, Swansea. 6.30 p.m. D. Tabor : *Hardness of metals.*

Wool Education Society, at Royal Society of Arts, W.C.2. 7 p.m. Professor F. J. Fisher : *England's trade in wool and cloth in the 16th and early 17th centuries.*

WED. 11 DEC. **Analytical Chemistry, Society for,** at Burlington House, W.1. 6.30 p.m. Discussion : *The analytical chemistry of copper and its alloys.*

Engineering Inspection, Institution of, at Royal Society of Arts, W.C.2. 6.45 p.m. R. Norbury : *Can works study be applied to inspection?*

Foundrymen, Institution of, British, at Constitutional Club, Northumberland Avenue, W.C.2. 7.30 p.m. F. Hudson : *Properties of castings in copper-base alloys.*

Metals, Institute of, at Constitutional Club, Northumberland Avenue. 7.30 p.m. F. Hudson : *Properties of casting.*

Radio Engineers, British Institution of, at Neville Hall, Westgate Road, Newcastle-upon-Tyne. 6 p.m. D. H. McBean : *Stereophonic sound and tape recorders.*

Victoria & Albert Museum, S.W.7. 6.15 p.m. Helen Lowenthal : *English formal gardens.*

THURS. 12 DEC. **Electrical Engineers, Institution of,** Savoy Place, W.C.2. 5.30 p.m. F. Bentham : *Electrical control of stage and television lighting.*

Liverpool Metallurgical Society, at 9 The Temple, Dale Street, Liverpool. 7 p.m. J. W. Rodgers : *Titanium.*

Radio Engineers, British Institution of, at 39 Elmbank Crescent, Glasgow. 7 p.m. R. E. Cooke : *High quality sound reproduction.*

FRI. 13 DEC. **Mechanical Engineers, Institution of,** 1 Birdcage Walk, S.W.1. 6 p.m. James Clayton Lecture. Professor Ing. Hans Thoma : *Hydrostatic machines.*

Radio Engineers, British Institution of, at Edinburgh University. 7 p.m. R. E. Cooke : *High quality sound reproduction.*

MON. 16 DEC. **Computer Society, British,** at Northampton College of Advanced Technology, London, E.C.1. 6.15 p.m. Dr. S. Gill : *Parallel programming : a study of a new technique in digital computer programming.*

TUES. 17 DEC. **Chemical Engineers, Institution of,** College of Science and Technology, Manchester. 7 p.m. Professor K. G. Denbigh : *Chemical engineering aspects of gas-solid reactions.*

Electrical Engineers, Institution of, Savoy Place, W.C.2. 5.30 p.m. Fourth Graham Clark Lecture. Sir Ewart Smith : *The engineer and management.*

WED. 18 DEC. **Modular Society,** at Royal Society of Arts, W.C.2. 7.30 p.m. Discussion : *One-night stand at the Building Centre.*

Radio Engineers, British Institution of, 9, Bedford Square, W.C.1. 6.30 p.m. E. Garthwaite and A. G. Wray : *Recent developments in electronic instrument design.*

Victoria & Albert Museum, S.W.7. 6.15 p.m. W. G. Archer : *The meaning of Indian sculpture.*

FRI. 20 DEC. **Engineers, Junior Institution of,** at 14 Rochester Row, S.W.1. 7 p.m. W. V. Barton : *The use of computers in industry.*

OTHER ACTIVITIES

NOW UNTIL SUN. 8 DEC. **Arts and Crafts Exhibition Society,** at Victoria & Albert Museum, S.W.7. Daily 10 a.m.–6 p.m. ; Sundays 2.30 p.m.–6 p.m.

NOW UNTIL 14 DEC. **Arts Council Gallery,** St. James's Square, S.W.1. Exhibition : *The arts of the Ming dynasty.*

NOW UNTIL 15 DEC. **Tate Gallery,** Millbank, S.W.1. *Permeke : an exhibition of his work from 1886–1952.*

NOW UNTIL 21 DEC. **Art Gallery,** Leicester. *Martin Bloch : Exhibition of his work from 1943 - 1954.*

NOW UNTIL TUES. 24 DEC. **The Designer Craftsmen,** 10 King's Parade, Cambridge. Daily 10–6 except Sundays. Exhibition : *Silver and stained glass.*

NOW UNTIL 4 JAN. **National Book League,** 7 Albemarle Street, W.1. *Ballet : Exhibition of books from 15th-century manuscripts, etc.*

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WED. 11 DEC. **Analytical Chemistry, Society for,** at Burlington House, W.1. 6.30 p.m. Discussion : *The analytical chemistry of copper and its alloys.*

Engineering Inspection, Institution of, at Royal Society of Arts, W.C.2. 6.45 p.m. R. Norbury : *Can works study be applied to inspection?*

Foundrymen, Institution of, British, at Constitutional Club, Northumberland Avenue, W.C.2. 7.30 p.m. F. Hudson : *Properties of castings in copper-base alloys.*

Metals, Institute of, at Constitutional Club, Northumberland Avenue. 7.30 p.m. F. Hudson : *Properties of casting.*

Radio Engineers, British Institution of, at Neville Hall, Westgate Road, Newcastle-upon-Tyne. 6 p.m. D. H. McBean : *Stereophonic sound and tape recorders.*

Victoria & Albert Museum, S.W.7. 6.15 p.m. Helen Lowenthal : *English formal gardens.*

THURS. 12 DEC. **Electrical Engineers, Institution of,** Savoy Place, W.C.2. 5.30 p.m. F. Bentham : *Electrical control of stage and television lighting.*

Liverpool Metallurgical Society, at 9 The Temple, Dale Street, Liverpool. 7 p.m. J. W. Rodgers : *Titanium.*

Radio Engineers, British Institution of, at 39 Elmbank Crescent, Glasgow. 7 p.m. R. E. Cooke : *High quality sound reproduction.*

FRI. 13 DEC. **Mechanical Engineers, Institution of,** 1 Birdcage Walk, S.W.1. 6 p.m. James Clayton Lecture. Professor Ing. Hans Thoma : *Hydrostatic machines.*

Radio Engineers, British Institution of, at Edinburgh University. 7 p.m. R. E. Cooke : *High quality sound reproduction.*

MON. 16 DEC. **Computer Society, British,** at Northampton College of Advanced Technology, London, E.C.1. 6.15 p.m. Dr. S. Gill : *Parallel programming : a study of a new technique in digital computer programming.*

TUES. 17 DEC. **Chemical Engineers, Institution of,** College of Science and Technology, Manchester. 7 p.m. Professor K. G. Denbigh : *Chemical engineering aspects of gas-solid reactions.*

Electrical Engineers, Institution of, Savoy Place, W.C.2. 5.30 p.m. Fourth Graham Clark Lecture. Sir Ewart Smith : *The engineer and management.*

WED. 18 DEC. **Modular Society,** at Royal Society of Arts, W.C.2. 7.30 p.m. Discussion : *One-night stand at the Building Centre.*

Radio Engineers, British Institution of, 9, Bedford Square, W.C.1. 6.30 p.m. E. Garthwaite and A. G. Wray : *Recent developments in electronic instrument design.*

Victoria & Albert Museum, S.W.7. 6.15 p.m. W. G. Archer : *The meaning of Indian sculpture.*

FRI. 20 DEC. **Engineers, Junior Institution of,** at 14 Rochester Row, S.W.1. 7 p.m. W. V. Barton : *The use of computers in industry.*

OTHER ACTIVITIES

NOW UNTIL SUN. 8 DEC. **Arts and Crafts Exhibition Society,** at Victoria & Albert Museum, S.W.7. Daily 10 a.m.–6 p.m. ; Sundays 2.30 p.m.–6 p.m.

NOW UNTIL 14 DEC. **Arts Council Gallery,** St. James's Square, S.W.1. Exhibition : *The arts of the Ming dynasty.*

NOW UNTIL 15 DEC. **Tate Gallery,** Millbank, S.W.1. *Permeke : an exhibition of his work from 1886–1952.*

NOW UNTIL 21 DEC. **Art Gallery,** Leicester. *Martin Bloch : Exhibition of his work from 1943 - 1954.*

NOW UNTIL TUES. 24 DEC. **The Designer Craftsmen,** 10 King's Parade, Cambridge. Daily 10–6 except Sundays. Exhibition : *Silver and stained glass.*

NOW UNTIL 4 JAN. **National Book League,** 7 Albemarle Street, W.1. *Ballet : Exhibition of books from 15th-century manuscripts, etc.*

THE ROYAL SOCIETY OF ARTS

JOHN ADAM STREET, ADELPHI, LONDON, W.C.2

FOUNDED IN 1754 AND INCORPORATED BY ROYAL CHARTER IN 1847

PATRON: HER MAJESTY THE QUEEN

PRESIDENT: HIS ROYAL HIGHNESS THE PRINCE PHILIP, DUKE OF EDINBURGH, K.G.

PROPOSAL FORM FOR MEMBERSHIP

Candidate's Name in full .....

Nationality .....

Address .....

.....

.....

Rank, Profession or Business .....

I desire to become a Fellow/an Associate Member of the Royal Society of Arts.

Signature of Candidate .....

Date of Birth .....

We hereby propose and recommend the above Candidate as a fit and proper person to become a Fellow/an Associate Member of the Royal Society for the Encouragement of Arts, Manufactures and Commerce.

Signatures of three fellows, at least one of whom must sign on personal knowledge :

Name in Block Capitals	Signature
[.....]	..... *(on personal knowledge)*
[.....]	.....
[.....]	.....

Read and suspended ..... Elected .....

Details of Candidate's past and present occupation, academic and professional qualifications (in the case of degrees the conferring University should be stated) and any other relevant information should be attached on a separate sheet.

THE SOCIETY'S CHRISTMAS CARD, 1957

The Society's House, by Thos. Malton, 1790

The card, which is in colour, is produced specially for Fellows of the Society. It is 7½″ × 6″, includes a description of the picture and bears the greeting: *With All Good Wishes for Christmas and the New Year*. Space is allowed for overprinting the sender's name and address if required.

PLEASE USE THE ORDER FORM OVERLEAF

ORDER FORM

To the Secretary,

THE ROYAL SOCIETY OF ARTS, JOHN ADAM STREET, ADELPHI, W.C.2.

I wish to order.....Christmas cards.

(*and to have my name and address printed as instructed below). A remittance for.....is enclosed in accordance with the prices quoted below. (* and includes the necessary amount for the extra printing).

From .....

Address to which cards are to be despatched .....

.....

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* Delete if printing of name and address is not desired

INSTRUCTIONS FOR PRINTING NAME AND ADDRESS

(Please write in block capitals and give exact wording and punctuation required.)

Name(s).....

Address .....

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.....

PRICES FOR FELLOWS RESIDENT IN THE UNITED KINGDOM

15/6 per dozen for the first five dozen.

14/6 per dozen thereafter.

1/6 each for orders of less than one dozen.

Additional cost of printing name and address :

20/– for four dozen or less.

2/– per dozen thereafter.

PRICES FOR FELLOWS RESIDENT OVERSEAS

14/– per dozen.

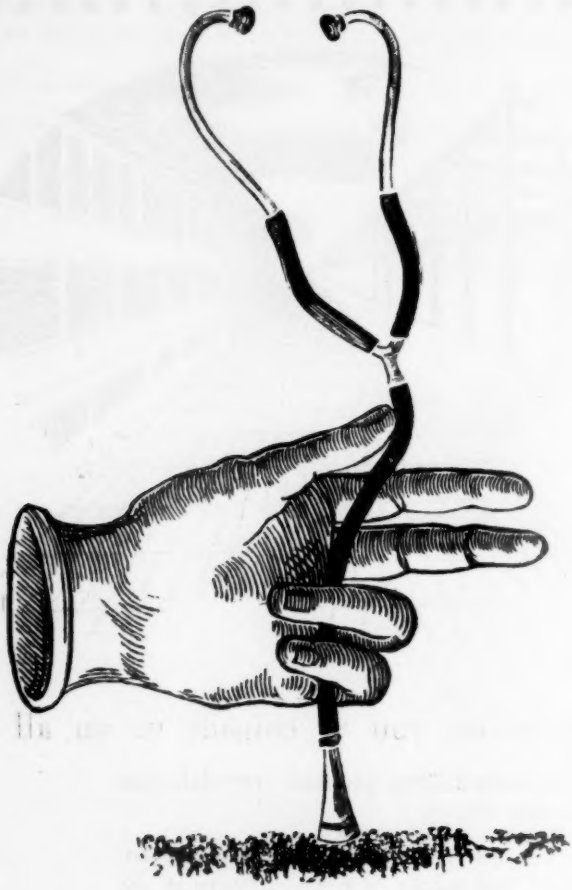
1/3 each for orders of less than one dozen.

Additional cost of printing name and address :

12/– for four dozen or less.

1/6 per dozen thereafter.

All prices include envelopes and postage at ordinary rates. Cards can be sent by air mail, if requested, at the appropriate additional cost.



sounding the earth

To sound–to listen–a scientist stills absolutely the rush of old echoes.

To observe, he looks and records with an eye peeled of memory.

Whether his work is going to improve the life of a man

or of a field of wheat he must listen and look as though for the first time.

Fundamental research–it's all in **FISONS** field